CHAPTER FOUR - ENVIRONMENTAL CONSEQUENCES

This chapter is the scientific and analytic basis for comparison among the four alternatives. It explains the probable consequences (impacts or effects) of each alternative on selected environmental resources.

The chapter will first examine impacts of the four alternatives on vegetation and fire ecology (Section 4.2), the Wildland Urban Interface (Section 4.3), and the sagebrush steppe ecosystem and Sagebrush Guild (Section 4.4). These issues address the most critical resources affected by the treatment levels proposed in the alternatives. Each issue is organized by field office in order to illustrate the differences in ecological issues and effects across the District.

4.1 INDICATORS AND GENERAL METHODOLOGY

In Sections 4.2 and 4.4, the impacts of Alternatives A, B, C, and D were assessed using the indicators listed below. Section 4.3 impacts were assessed using only Footprint-acres.

- Footprint-acres. Footprint-acres indicate the levels of soil disturbance relative to the four alternatives.
- Percentages of sage grouse Source Habitat affected. Source Habitat indicates the relative proportion (percent) of sage grouse Stronghold and Isolated Habitat disturbed by each alternative.
- DFC (expressed as a percentage). DFC is used as a long-term management objective for vegetation cover types. DFC can be compared to current conditions, as well as the relative merits of each alternative to achieve DFC within 30 years. For DFC analysis, vegetation cover types were split into different age classes (years since last fire) or seral stages to analyze the effects of the four alternatives.
- FRCC 1 through FRCC 3. FRCC is a landscape-level fire risk assessment index of to what extent current conditions deviate or depart from historical conditions in the areas of vegetation and fuels structure and composition and fire rotation. FRCC is used to compare the long-term effects of the four alternatives at 30 years after implementation. FRCC 1 indicates conditions that are within the range of historical variability, while FRCC 2 and 3 indicate how far current conditions depart from the historical range.

In Figures 4-1 through 4-25, below, FRCC is the product of both the x-axis, which indicates the departure of current fire rotation from historical fire rotation, and the y-axis, which indicates the departure of current vegetation and fuels structure and composition from historical vegetation conditions (DFC). For each vegetation cover type, departure of fire rotation (x-axis) was based on the District's 32-year wildland fire history between 1970 and 2001. The departure of vegetation and fuels from DFC (y-axis) was determined by using age class/seral stage distributions and adding the percentages that each age class/seral stage contributes to DFC. FRCC categories are as follows: FRCC 1 through 3: FRCC 1 = 0 to 33 percent departure from historical conditions; FRCC 2 = 33 to 66 percent departure from historical conditions; and FRCC 3 = 66 to 99 percent departure from historical conditions.

AGE-CLASSES AND SERAL STAGES - Current condition of vegetation and DFC were analyzed for seven vegetation groups using age-classes to approximate seral stages (see Table 4-2, e.g.). It is recognized that age classes and seral stages are not identical, but for any one vegetation group there are rough correspondences between age classes and seral stages. Seral stages better describe the impacts of treatments on resources than do age classes. In the sagebrush steppe ecosystem, for example, it is more meaningful to relate the effects of early-, middle-, and late seral communities on sage grouse populations than it is to relate to the effects of three age classes of vegetation. Furthermore, the District does not routinely collect seral stage data at the landscape level. Thus, there were no landscape level data available for these analyses that could be correlated with seral stages other than 'years since last fire'. In the following discussion, age classes are used to roughly approximate seral stages at the landscape level for purposes of analysis only.

4.2 ANALYSIS OF EFFECTS ON COHESIVE STRATEGY AND VEGETATION RESOURCES (ISSUE 1)

This section details the effects of treatment levels on vegetation and fire ecology across alternatives, including those treatment levels that are higher than what is proposed in Alternative B. In doing so, this section addresses Issue 1 as described in Section 1.4.1, Issues Driving Development of Alternatives.

4.2.1 ANALYSIS OF EFFECTS FOR THE IDAHO FALLS FIELD OFFICE (IFFO)

4.2.1.1 Low-elevation Shrub, Perennial Grass, and Annual Grass

4.2.1.1.1 Short-term Effects

Alternative treatment levels for these cover types of the IFFO range from approximately 4,300 acres (Alternative A) to 474,000 acres (Alternative D; Table 4-1). The goal is to improve vegetation structure and composition, as well as reducing fire return intervals and fire size.

IFFO has most of the Low-elevation Shrub and Perennial Grass cover types in the District. A minor proportion (less than 5 percent) of sagebrush steppe has been converted to Annual Grass. Treatments would focus on: 1) diversifying Perennial Grass to speed reestablishment of sagebrush cover types, and 2) enhancing structural and species diversity in degraded sagebrush steppe cover types. Sagebrush would be aerially seeded into Perennial Grass that burns by RxFire or wildland fire for hazardous fuel control. Aerial seeding of sagebrush would have negligible impacts on native vegetation. Fire would remove biomass and canopy structure of sagebrush steppe. On the other hand, Perennial Grass wildland fires rarely burn at high intensity; thus, for perennial grasses, forbs and shrubs that re-sprout, mortality is unlikely. Therefore, Perennial Grass would be expected to begin recovery during the growing season following a fire.

Rehabilitation and/or hazardous fuels reduction actions would seed shrubs and grasses to speed succession back to sagebrush steppe. Areas where cheatgrass has become established would also be seeded with perennial grasses and forbs to restore a healthy herbaceous understory. BLM would use approved chemicals to control cheatgrass and noxious weeds. Short-term effects of treatments would include the mortality of non-target plants due to herbicide use and from seeding methods that cause soil surface disturbance, affecting shallow-rooted species.

While Alternative A would treat the fewest acres (see Table 4-1) and have the least short-term impacts, Alternative D would treat large areas (approximately 34 percent) of sagebrush steppe (sum of Low-elevation Shrub, Perennial Grass, and Annual Grass). Alternatives B and C would treat approximately 11 percent and 16 percent of this cover type, respectively, and would have intermediate effects.

TABLE 4-1. VEGETATION COVER TYPES AND THEIR ACREAGES IN THE IDAHO FALLS FIELD OFFICE (IFFO)

Cover type	Total Acres in IFFO	Alternatives (footprint-acres)[1]			
		A[2]	B[3]	C	D
Low-elevation Shrub	913,183	2,500	101,500	55,200	216,790
Perennial Grass	470,003	1,750	52,600	172,000	257,000
Annual Grass	36	0	0	36	0
Mid-elevation Shrub	231,518	16,500	56,990	161,700	78,220
Juniper	5,380	0	2,200	3,300	900
Salt Desert Shrub	27,410	0	0	0	0
Aspen/Conifer	10,276	200	6,100	500	0
Dry Conifer	20,132	1,000	4,950	800	0
Mountain Shrub	13,036	200	5,080	1,530	9,730
Wet/Cold Conifer	14,094	220	0	1,075	0
Vegetated Rock/Lava	304,793	100	5,780	0	0
TOTAL	**2,009,861**	**22,470**	**235,200**	**396,141**	**562,640**

[1] Footprint-acres describe broad treatment levels over 10 years for rehabilitation and restoration.
[2] Alternative A is the No Action Alternative, which would continue present management direction.
[3] Alternative B is the Proposed Action Alternative.

4.2.1.1.2 Long-term Effects

Treatments applied to poor condition Low-elevation Shrub would be positive, resulting in cover types with sagebrush canopy and a diverse, perennial understory. Alternatives B, C, and D would treat approximately 11 percent, 16 percent, and 34 percent of the existing sagebrush steppe, respectively, much of which is lacking in perennial understory and is at risk of encroachment by cheatgrass. Alternative D would make the most progress towards creating a more resilient landscape. Alternative A would do little to improve or rehabilitate the Low-elevation Shrub cover type in the IFFO.

Treatments in Perennial Grass would have long-term positive effects by reestablishing a shrub canopy and herbaceous understory on sagebrush steppe sites. Alternative D would seed sagebrush on approximately 55 percent of this cover type, while Alternatives B and C would seed approximately 11 percent and 37 percent of this cover type, respectively (see Table 4-1). Alternative D would better facilitate succession to a later successional state than the other alternatives. Alternative A would treat only a fraction of Perennial Grass acreage and would not affect succession and reestablishment of sagebrush in continuous or connected blocks.

Treatments in Annual Grass, Perennial Grass, and Low-elevation Shrub cover types would be directed towards achieving DFC, consistent with percentage values in Table 4-2. DFC consists of a plant mixture of different species and age classes/seral states with some allowable uncharacteristic vegetation. In Table 4-2, cheatgrass is considered an uncharacteristic species and could remain part of the cover type since it is not expected to be completely eradicated.

All alternatives would improve the overall condition Low-elevation Shrub, Perennial and Annual Grass cover types in the IFFO but to varying degrees. All alternatives improve the proportions of <15-year and 15- to 30-year age class cover types and reduce >30-year age class grass/shrub cover types. All alternatives assume some further loss of mature sagebrush steppe while Perennial Grass is reduced and early grass/shrub cover types are established. None of the alternatives would achieve DFC within 30 years of implementation, since wildland fires would continue, though with reduced intensities, severities and frequencies.

TABLE 4-2. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR LOW-ELEVATION SHRUB, PERENNIAL GRASS, AND ANNUAL GRASS, IDAHO FALLS FIELD OFFICE (IFFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[3]	B[4]	C	D
Perennial Grass <15-year	14%	29%	25%	31%	24%	27%
Grass/Shrub 15-30-year	14	1	27	32	29	29
Shrub/Grass >30-year	52	48	37	28	40	41
Crested Wheatgrass	NA[5]	1	1	1	1	1
Cheatgrass[2]	<20	21	11	9	7	3

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.

[2] Although absence of cheatgrass is desirable, these percentages have been deemed acceptable, since complete eradication of cheatgrass is impossible.

[3] Alternative A is the No Action Alternative, which would continue present management direction.

[4] Alternative B is the Proposed Action Alternative.

[5] Not applicable; no DFC was set for Crested wheatgrass because no treatments are proposed for these areas.

Under all alternatives, Low-elevation Shrub, Perennial Grass and Annual Grass would remain within the range of FRCC 2 after 30 years and no alternative would achieve FRCC 1 (Figure 4-1). Alternative A would not change the current condition (i.e., no

change in fire rotation or vegetation and fuels structure and composition). Alternative B would improve (lengthen) fire rotation, but would not improve vegetation and fuels structure and composition. Alternatives C and D would reduce the frequency of wildland fires and produce fire rotations longer than the historical rotation; therefore departures for Alternatives C and D show increases above 40 percent and 55 percent, respectively. Alternative C would maintain current vegetation and fuels structure and composition while Alternative D would slightly improve it.

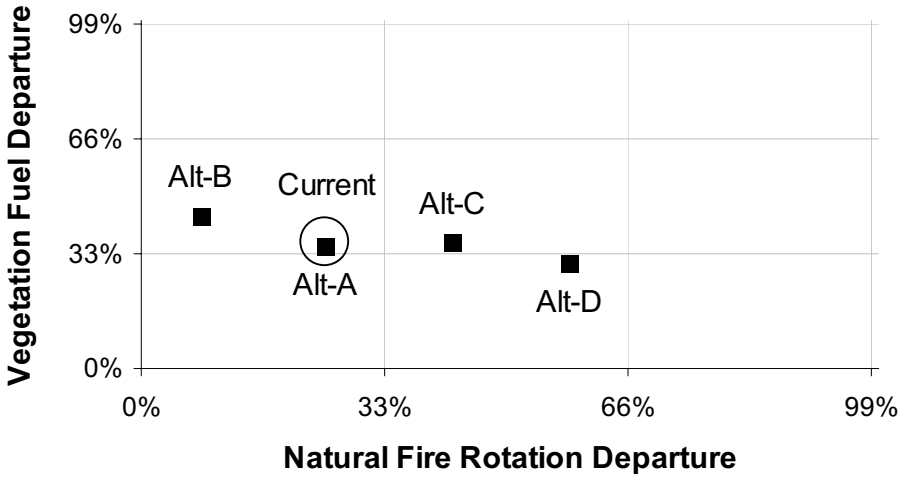

Figure 4-1. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Low-elevation Shrub, Perennial Grass, and Annual Grass in the Idaho Falls Field Office (IFFO).

Note: FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

Alternatives C and D would not affect early successional stages. They would, however, increase the proportion of mid-successional stages and substantially decrease the proportion of uncharacteristic vegetation. Vegetation and fuels structure and composition would most closely approach DFC under Alternative D. In the IFFO, a longer fire rotation in these cover types would help reduce habitat fragmentation and/or aid the restoration of large areas of sagebrush steppe in adjacent portions of the District as well as reducing the potential for uncharacteristic vegetation to establish following wildland fire.

4.2.1.2 Mid-elevation Shrub and Juniper

4.2.1.2.1 Short-term Effects

Alternative treatment levels for these cover types of the IFFO range from approximately 16,500 acres (Alternative A) to 165,000 (Alternative C) acres of Mid-elevation Shrub and Juniper, which includes areas of juniper encroachment (see Table 4-1), with the goal of improving vegetation structure and composition, as well as reintroducing fire in areas where juniper encroachment is a problem.

The Mid-elevation Shrub cover type has been affected by reduced wildland fire frequencies, juniper invasion in some areas, and increased shrub densities and the impoverishment of the herbaceous understory in other areas. This has reduced the quality of sagebrush steppe habitats. Treatments in Mid-elevation Shrub would focus on RxFire and WFU, as well as mechanical methods, to reduce shrub and juniper density. Areas with invasive or noxious weeds would receive chemical treatments to reduce or eliminate infestations. Chemical treatments would also be used for selective thinning of shrub cover or to eliminate immature encroaching junipers within the Juniper cover type. Seeding could occur after fire and/or mechanical treatments in areas where the understory has been depleted.

Short-term effects of RxFire and WFU would include the reduction of shrub and tree canopy, as well as the temporary reduction in herbaceous cover due to the removal of biomass. Wildland fire could result in greater mortality and more continuous removal of canopy due to higher heat intensities than with RxFire. Herbaceous cover, particularly annual species, should increase within two growing seasons following a fire. Chemicals would be used to control invasive or noxious weeds on burned areas. Chemical treatments could result in the mortality of non-target species.

Mechanical treatments would be used in areas or situations where RxFire or WFU is not appropriate or effective, or where selective vegetation removal is desired. Mechanical treatments would have little short-term effect on non-target plants, due to the specificity of the treatments on target vegetation. One exception would be damage to shallow-rooted species when using chaining or a Dixie harrow. Seeding methods that result in soil surface disturbance (drilling, chaining, and harrowing) could result in similar disturbance. However, seeding of grasses and forbs utilizing these methods would be conducted primarily where the understory is depleted; therefore the negative impacts would be minimal.

Alternative A would treat the fewest acres (approximately 7 percent of Mid-elevation Shrub and Juniper; see Table 4-1) and, therefore, would have the least short-term impact. This alternative, however, would do little to control juniper encroachment and restore landscape-level structural diversity. Alternative C, in contrast, would treat approximately 70 percent of the total acreage over 10 years, or approximately 16,500 acres annually, with the goal of restoring historical fire rotation intervals at a landscape scale. Alternatives B and D propose to treat 25 percent and 33 percent of the area, respectively, and would have intermediate effects to Alternative A and Alternative C.

4.2.1.2.2 Long-term Effects

Treatments applied to Mid-elevation Shrub and areas of juniper encroachment within Juniper would have long-term positive effects due to increasing the diversification of vegetation structure and composition. Alternative C is the most aggressive of the alternatives and would do the most to reintroduce historical wildland fire regimes on a landscape scale. Alternative C is the only alternative that would move the mix of desirable successional states for Mid-elevation Shrub towards DFC (Table 4-3). All alternatives would keep uncharacteristic vegetation below 15 percent, with Alternative B meeting DFC.

TABLE 4-3. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR MID-ELEVATION SHRUB AND JUNIPER, IDAHO FALLS FIELD OFFICE (IFFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[2]	B[3]	C	D
Perennial Grass <15-year	23%	0%	3%	6%	20%	14%
Grass/Shrub 5-15-year	45	7	9	18	34	16
Shrub/Grass >15-year	23	86	73	67	35	57
Juniper	7	2	8	7	5	6
Cheatgrass	2	5	7	2	6	7

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.
[2] Alternative A is the No Action Alternative, which would continue present management direction.
[3] Alternative B is the Proposed Action Alternative.

All alternatives would treat Mid-elevation Shrub and Juniper with the intention of moving these cover types toward FRCC 1 (Figure 4-2). Alternative A, however, would maintain the current condition in FRCC 3 and would not increase fire frequency. Thus, Alternative A would permit the continued accumulation of fuels; the dominance of old, decadent shrubs; increased juniper densities; and/or increased encroachment of juniper into Mid-elevation Shrub. Increased juniper densities would increase wildland fire hazard by supporting larger, more intense and more severe wildland fire.

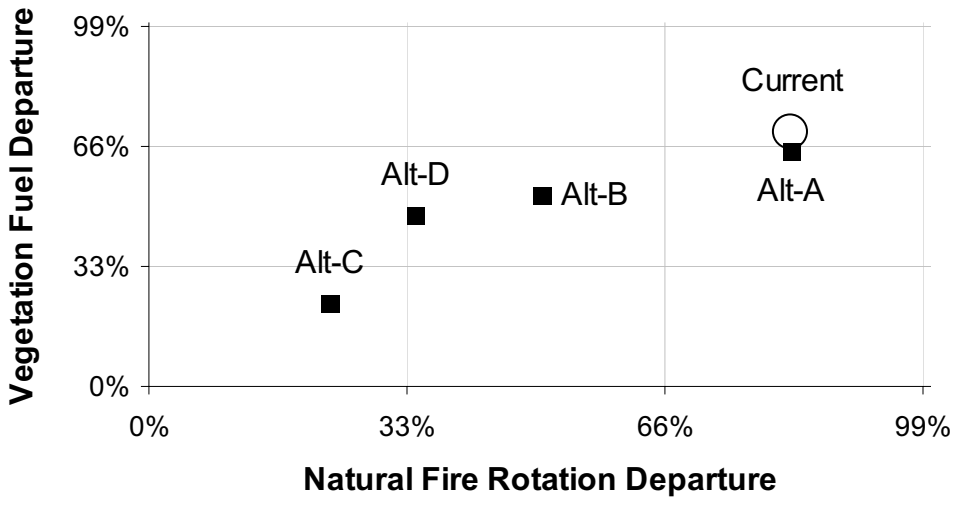

Figure 4-2. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Mid-elevation Shrub and Juniper in the Idaho Falls Field Office (IFFO).

Note: FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

Alternatives B and D would move the current condition from FRCC 3 to FRCC 2. Fire rotation would be shortened in these cover types; however, neither alternative proposes enough treatment, or decreases the vegetation/fuel departure enough, to achieve FRCC 1 in 30 years. Alternative C would move the current conditions to FRCC 1. Under C, fire rotation would approximate the historical rate, and the desired mix of successional stages and vegetation and fuels structure and composition across the landscape would approach DFC.

4.2.1.3 Salt Desert Shrub

There are no planned treatments in the Salt Desert Shrub cover type in the IFFO.

4.2.1.4 Aspen/Conifer and Dry Conifer

4.2.1.4.1 Short-term Effects

Alternative treatment levels for these cover types range from 0 acres (Alternative D) to approximately 11,050 acres (Alternative B) of Aspen/Conifer and Dry Conifer (see Table 4-1), with the goal of rejuvenating aspen stands and creating a diversity of forest successional stages and associated forest structure and species composition across the landscape.

Short-term effects of restoration treatments in the Aspen/Conifer and Dry Conifer cover types would reduce aspen and dry conifer densities, decrease overstory canopy cover, and increase gaps in forest structure that allow solar radiation to reach understory vegetation and/or soil surface. A temporary reduction in understory shrub, grass, and forb cover would occur with RxFire and WFU. The vast majority of shrubs found in this vegetation resprout after fire and would provide structure and shade to the soil surface within a year or two following treatment. Perennial grasses and forbs would also resprout or recolonize the treatment areas. Increased soil temperatures, aspen root scarification, and/or a decrease in the number of older aspen trees would encourage aspen regeneration via resprouting or "suckering."

Alternative D would not treat any forest type, including Aspen/Conifer and Dry Conifer cover types and, therefore, would produce no short-term effects. Alternative A and Alternative C would treat small, but intermediate levels of this cover type (less than 4 percent) and would produce relatively few short-term effects. Alternative B would treat the most acres (36 percent of these types) and would produce substantial short-term effects. Alternative D would not treat any of this cover type and would not produce any short-term effects in this cover type.

4.2.1.4.2 Long-term Effects

Long-term effects of treatment across alternatives in the Aspen/Conifer and Dry Conifer types are positive and would result in a diversity of forest successional stages across the landscape. Pure aspen stands would become larger and more numerous. Vegetation species richness across the landscape would increase as the proportion of forest successional stages becomes more even. The number of stands at high risk to forest insect and disease outbreaks and subsequent severe wildland fire would decrease.

Treatments for the Aspen/Conifer and Dry Conifer cover types would be applied with the intent of moving towards a vegetation/fuels DFC consisting of a 40:40:20 mix of early,

mid-, and late successional forest cover types (Table 4-4). None of the alternatives would achieve DFC in 30 years; however, Alternatives B and C would achieve a more even distribution of successional forest cover types across the landscape and would make the most progress towards DFC. Both of these alternatives increase the percentage of early and mid-successional forest and decrease the percentage of late successional forest. Alternative A and Alternative D move away from DFC, slightly increasing the amount of early successional forest, decreasing the amount of mid-successional forest, and increasing the amount of late successional forest from current proportions.

TABLE 4-4. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR ASPEN/CONIFER AND DRY CONIFER, IDAHO FALLS FIELD OFFICE (IFFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[2]	B[3]	C	D
Forb/grass with aspen trees/suckers, <25 years old	40%	3%	6%	13%	10%	5%
Aspen/Conifer/shrub mix, 25-50 years old	40	29	24	43	34	22
Conifer-dominated, >50 years old	20	68	70	44	56	73

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.
[2] Alternative A is the No Action Alternative, which would continue present management direction.
[3] Alternative B is the Proposed Action Alternative.

All alternatives would treat Aspen/Conifer and Dry Confer with the intention of moving these cover types towards FRCC 1 (Figure 4-3). Alternative A, however, would maintain (current) FRCC 2 and would permit accumulation of fuels, an increase in conifer tree densities, and higher rates of insect attacks and disease. Forests composed of Dry Conifer with a litter understory would pose a greater wildland fire hazard and would more likely burn with stand-replacement severity as opposed to Aspen/Conifer with a grass/forb/shrub understory. Wildland fire sizes and intensities would be greater in Dry Conifer-dominated areas, often leading to crown-fires. Under Alternative A, the proportions of successional stages would be unbalanced, allowing for too many late successional stages that would increase the departure from historical vegetation stages.

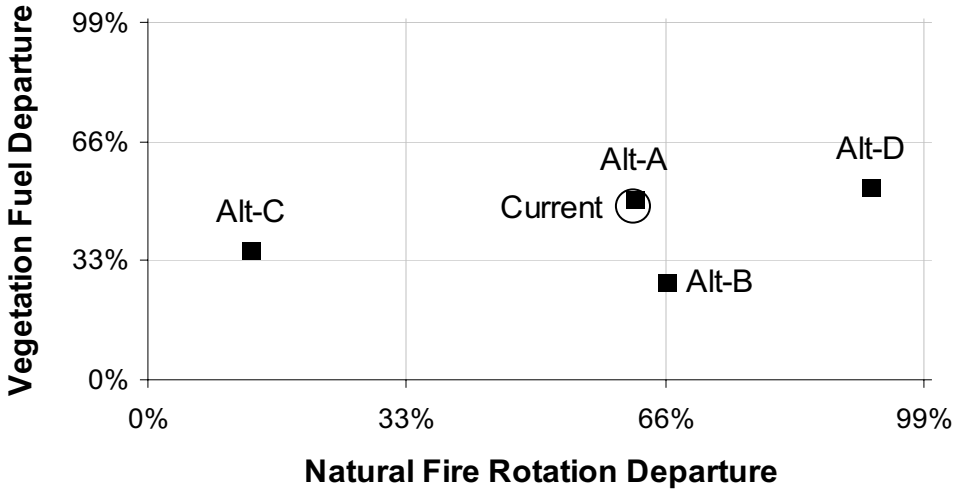

Figure 4-3. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Aspen/Conifer and Dry Conifer in the Idaho Falls Field Office (IFFO).

Note: FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

Alternative B would maintain FRCC 2 while moving vegetation and fuels structure and composition toward DFC and shortening the fire rotation. A shorter fire rotation would increase early and mid-successional stages and decrease late successional stages. In 30 years, Alternative B would decrease the departure of vegetation/fuels the most; however, an increase in vegetation/fuel departure would occur if the shorter fire rotation rate was maintained beyond the first decade.

Alternative C would move these cover types close to FRCC 1 in 30 years. Fire rotation would approximate the historical rate, creating the desired mix of successional forest cover types and vegetation and fuels structure and composition across the landscape. Alternative D would not treat these cover types, and would permit both a decline from FRCC 1 to FRCC 3 and an increase in hazardous conditions. Under D, fire rotation would be maintained at a rate less than the historic, causing fuel build-up. After 30 years, this alternative would increase late successional stages (Dry Conifer) and fewer early and mid-successional stages (Aspen/Dry Conifer).

4.2.1.5 Mountain Shrub

4.2.1.5.1 Short-term Effects

Alternative treatment levels for this cover type in the IFFO range from 200 acres (Alternative A) to approximately 9,700 acres (Alternative D) of Mountain Shrub (see Table 4-1), with the goals of rejuvenating old, decadent shrubs; increasing cover and density of desirable herbaceous species; reducing cover and density of uncharacteristic vegetation (i.e., cheatgrass and noxious weeds); and creating a diversity of successional stages in a mosaic across the landscape.

Treatments primarily would be RxFire and WFU. Short-term effects of restoration treatments would include a temporary decrease in shrub, grass, and forb canopy cover. High severity fires would kill some individual shrubs, this is particularly true for antelope bitterbrush at lower elevations and mountain mahogany. These changes would increase the amount of solar radiation reaching the soil surface. The vast majority of Mountain Shrub species resprout after low-to-moderate-severity fire and would provide structure and shade to the soil surface within a year or two following treatment. Effects of fire on mountain mahogany, however, could persist for a number of years (and perhaps into the long term) due to a general lack of resprouting. Perennial grasses and forbs would resprout or recolonize the treatment areas. Shrub leader growth would be vigorous following treatment due to increased light and soil temperatures as well as a reduction in standing, dead, woody material.

Alternative A would treat the fewest acres (less than 2 percent of this cover type) and would have negligible short-term impacts. Alternative D would treat the most acres (approximately 75 percent of this cover type) and would have substantial short-term impacts. Alternatives B and C propose intermediate amounts of treatment (39 percent and 12 percent of this cover type respectively) and would result in an intermediate level of short-term effects.

4.2.1.5.2 Long-term Effects

Effects of treatment across alternatives in the Mountain Shrub cover type would be positive and would result in a diversity of shrub successional stages across the landscape. Stands of Mountain Shrub would become larger and more numerous. Across the landscape, species richness would increase as the proportion of shrub successional stages becomes more even. The number of shrub stands at risk of severe wildland fire due to heavy fuel loading would decrease.

Treatments in Mountain Shrub would be applied with the intent of moving towards a vegetation/fuels DFC consisting of a 33:33:34 mix of early, mid-, and late successional shrub cover types (Table 4-5). None of the alternatives would achieve DFC in 30 years; however, three alternatives would achieve a more even distribution of successional stages across the landscape. Alternative D would most closely approximate DFC followed by Alternative C. Alternative B would make limited progress towards DFC. These three alternatives would increase the percentage of early and mid-successional shrub cover types and decrease the percentage of late successional shrub cover types.

TABLE 4-5. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR MOUNTAIN SHRUB, IDAHO FALLS FIELD OFFICE (IFFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[2]	B[3]	C	D
Perennial grass/shrub, <10 years old	33%	0%	4%	9%	11%	13%
Shrub/perennial grass, 10-20 years old	33	3	2	18	23	32
Shrub dominated, >20 years old	34	97	94	73	66	55

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.
[2] Alternative A is the No Action Alternative, which would continue present management direction.
[3] Alternative B is the Proposed Action Alternative.

All alternatives would treat Mountain Shrub with the intention of moving towards FRCC 1 (Figure 4-4). Alternative A would maintain the current condition in FRCC 3, however, and permit the dominance of old, decadent shrubs; depletion of understory species; and woody fuel build-up. Increased fuel structure and composition would increase fire hazard by supporting larger, more intense and severe wildland fires. Alternative B would improve the current condition to FRCC 2. Fire rotation would be shortened in this cover type; however, Alternative B would not treat enough vegetation or decrease the vegetation/fuel departure enough to achieve FRCC 1 in 30 years.

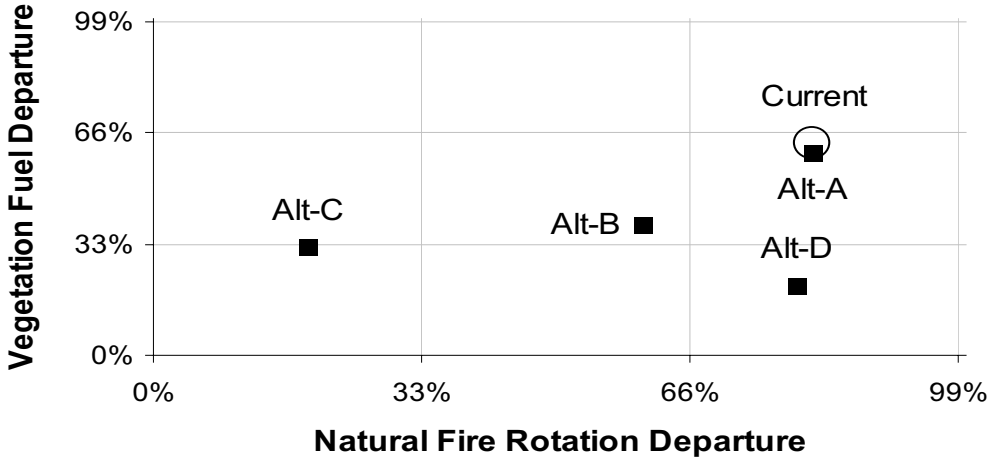

Figure 4-4. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Mountain Shrub in the Idaho Falls Field Office (IFFO).

Note: FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

Alternative C would achieve FRCC 1 in 30 years. Fire rotation would become shortened to approximate the historical rate, and treatments would create a mix of successional stages and fuel loadings across the landscape that approach DFC. Alternative D would maintain FRCC 3; but due to an aggressive treatment regime, Alternative D would implement too much treatment over too short a period of time, making the disturbance rate shorter than the historical fire rotation. In this cover type, the short fire rotation would create too much early and mid-successional stages and too few late successional stages across the landscape.

4.2.1.6 Wet/Cold Conifer

4.2.1.6.1 Short-term Effects

Alternative treatment levels for this cover type in the IFFO range from 0 acres (Alternatives B and D) to approximately 1,100 acres (Alternative C) of Wet/Cold Conifer (Table 4-6), with the goals of reducing risk of insect infestation and disease as well as creating a diversity of forest successional stages and associated forest structure across the landscape. In areas where private landowners are intermingled with the forest, the goal of treatment would be to reduce threats to life and property by reducing wildland fire intensity and spread.

Short-term effects of restoration treatments in Wet/Cold Conifer would reduce tree density, decrease overstory canopy cover, and increase the amount of solar radiation reaching the understory vegetation and/or soil surface. Where mechanical treatments are used, a reduction in mature and pole-sized lodgepole pine tree density would occur. Where WFU treatments are used, overstory trees would be replaced by understory shrubs, grasses, and forbs, while lodgepole pine would reproduce and grow above the understory vegetation within approximately ten years following disturbance.

Alternatives B and D would not treat Wet/Cold Conifer and would have no short-term effects. Alternative A and Alternative C would treat few acres in this cover type (less than 0.5 percent) and would have negligible short-term effects.

4.2.1.6.2 Long-term Effects

Effects of treatment across alternatives in the Wet/Cold Conifer cover type would be positive and would result in more resilient forest stands and a diversity of forest successional stages across the landscape. Lodgepole pine stands would become more capable of withstanding insect and disease outbreaks. Vegetation species richness across the landscape would increase as the proportion of forest successional stages becomes more even. In areas where private landowners are intermingled with the forest, the goal of treatment would be to reduce threats to life and property by reducing wildland fire intensity and spread.

Treatments in Wet/Cold Conifer would move this cover type towards a vegetation/fuels DFC consisting of a 30:44:26 mix of early, mid-, and late successional forest cover types (see Table 4-6). None of the alternatives would achieve DFC in 30 years. Alternative C is the only alternative that would achieve a more even distribution of successional forest cover types across the landscape. This alternative would increase the percentage of early and mid-successional stages and decrease the percentage of late successional stages across the landscape. Furthermore, Alternative C is the only alternative that would

substantially decrease the threats associated with wildland fire to life and property in the Wildland Urban Interface. Alternatives A, B, and D make very limited progress towards DFC (through limited treatment and/or wildland fire) by slightly increasing early successional stages and slightly decreasing late successional stages.

TABLE 4-6. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR WET/COLD CONIFER, IDAHO FALLS FIELD OFFICE (IFFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[2]	B[3]	C	D
Forb/grass with seedlings	30%	2%	5%	3%	26%	3%
Conifer shrub mix	44	10	9	9	17	9
Conifer-dominated	26	89	86	88	57	88

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.

[2] Alternative A is the No Action Alternative, which would continue present management direction.

[3] Alternative B is the Proposed Action Alternative.

Alternative A and Alternative C would treat Wet/Cold Conifer with the intention of moving this cover type towards FRCC 1 (Figure 4-5). Alternative A, however, would treat very little of this cover type and maintain current FRCC 2. Alternatives B and D would not treat Wet/Cold Conifer. Since growth and succession rates are so slow in this cover type, however, lack of treatments would not exacerbate existing conditions. Forests in FRCC 2 would have moderate-to-high stocking densities, substantial ladder fuels (e.g., small trees and overlapping deadfall), and moderate- to wide-spread insect and disease outbreaks.

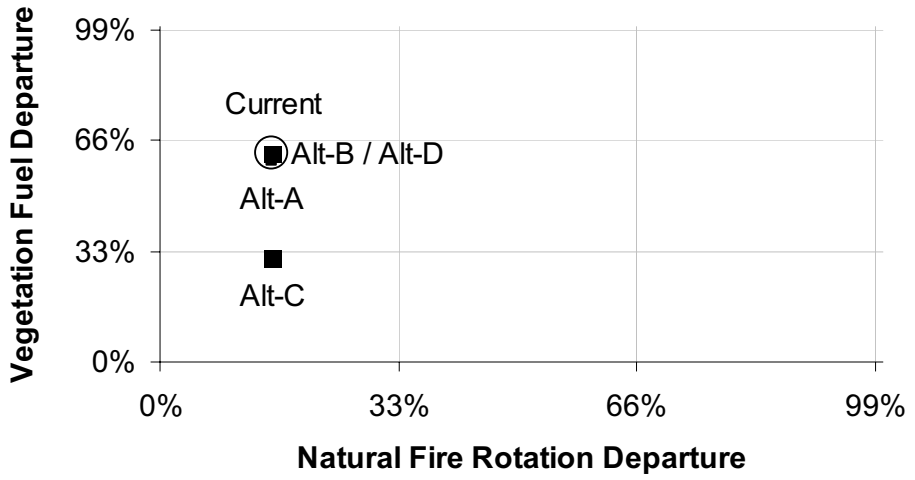

Figure 4-5. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Wet/Cold Conifer in the Idaho Falls Field Office (IFFO).

Notes:

FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

Due to the lack of long-term fire history data for this cover type, the FRCC rating is based on vegetation/fuel departure. For clarity, departure from the historical fire rotation was positioned at the midpoint of FRCC 1.

Alternative C would achieve FRCC 1 in Wet/Cold Conifer within 30 years (see Figure 4-5). Forests in FRCC 1 would have the desired mix of successional stages and vegetation and fuels structure and composition close to DFC across the landscape. In Wildland Urban Interface areas, threats to life and property would be reduced. In the Wildland Urban Interface, where life and property are priorities, Alternative C vegetation treatments would not achieve FRCC, but would manipulate forest structure to reduce wildland fire intensity and spread.

4.2.1.7 Vegetated Rock/Lava

4.2.1.7.1 Short-term Effects

Alternative treatment levels for the Vegetated Rock/Lava cover type range from 0 acres (Alternatives C and D) to approximately 5,800 acres (Alternative B; see Table 4-1). These treatments would consist of WFU and chemical treatments to control noxious weeds.

WFU would be allowed on Vegetated Rock/Lava in Alternative A and Alternative B, with a minimal amount in Alternative A (see Table 4-1). Since wildland fire starts on Vegetated Rock/Lava are infrequent, it is assumed that only a small fraction of the existing acreage would burn. This cover type is discontinuous and limited to areas with some soil development; therefore, wildland fires would have minimal spread. Wildland fire is primarily allowed due to suppression difficulties. However, since cheatgrass is not a substantial problem in this type, WFU allows for historical successional processes to

occur. Noxious weed invasions, usually found near the edges of Vegetated Rock/Lava, would be chemically treated to prevent or reduce spread.

Short-term effects would include the mortality of vegetation due to WFU, and mortality of non-target vegetation due to chemical treatment of noxious weeds. Vegetation mortality due to wildland fire would be most noticeable for long-lived shrubs and trees, such as Wyoming big sagebrush and junipers. Since vegetation is patchy, fire effects would also be discontinuous, creating openings in areas with dense concentrations of fuels.

4.2.1.7.2 Long-term Effects

All alternatives would tend to increase the proportion of early to-mid-seral vegetation in this cover type, while decreasing late seral shrub/tree cover types dominated by sagebrush and juniper (Table 4-7). All alternatives would move this cover type away from DFC, with Alternatives C and D being equal, but slightly worse than Alternative B. Alternative A would move this cover type away from DFC the least but the percentage of cheatgrass-infested acreage would not decrease from current proportions. Alternative B is the only alternative that includes proactive chemical treatments, and it would slightly decrease the percentage of cheatgrass-infested acreage within this type.

TABLE 4-7. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR VEGETATED ROCK/LAVA, IDAHO FALLS FIELD OFFICE (IFFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[2]	B[3]	C	D
Perennial herbaceous	6%	11%	16%	22%	17%	17%
Tree/shrub/herbaceous	80	75	68	66	67	67
Cheatgrass	14	14	16	12	16	16

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.

[2] Alternative A is the No Action Alternative, which would continue present management direction.

[3] Alternative B is the Proposed Action Alternative.

All alternatives would maintain the Vegetated Rock/Lava in FRCC 1. Alternative A would have the least departure from the vegetation/fuels DFC. Alternative B would apply treatments in the Vegetated Rock/Lava cover type to change vegetation and fuels structure and composition to DFC (Figure 4-6). Alternative B is the only alternative with proactive chemical treatments proposed for cheatgrass control and, therefore, decreases the percentage of cheatgrass-infested acres more than any other alternative. Alternative B would also be the most flexible and would allow for an Appropriate Management Response when suppressing fires in, or adjacent to, this cover type.

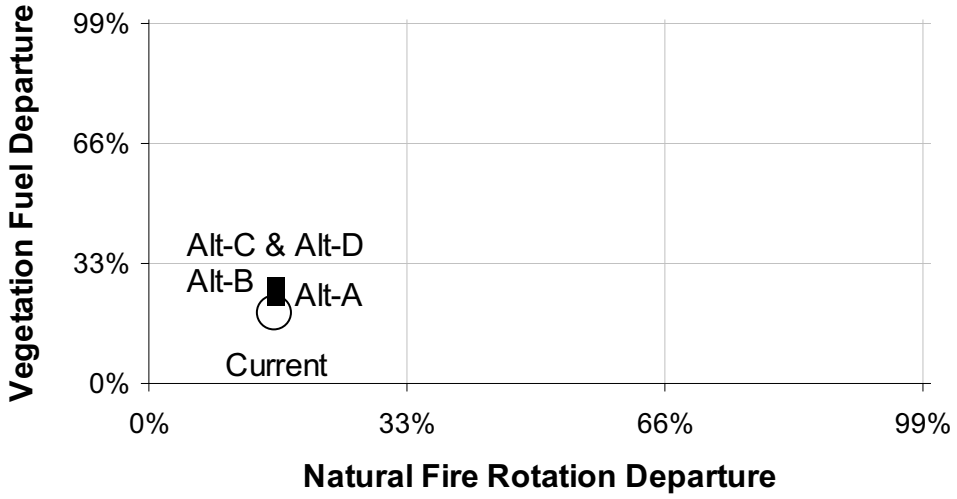

Figure 4-6. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Vegetated Rock/Lava in the Idaho Falls Field Office (IFFO).

Notes:

FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

Due to the lack of long-term fire history data for this cover type, the FRCC rating is based on vegetation/fuel departure. For clarity, departure from the historical fire rotation was positioned at the midpoint of FRCC 1.

4.2.2 Analysis of Effects for the Pocatello Field Office (PFO)

4.2.2.1 Low-elevation Shrub, Perennial Grass, and Annual Grass

4.2.2.1.1 Short-term Effects

Alternative treatment levels for these cover types of the PFO range from 0 acres (Alternative A) to approximately 69,000 acres (Alternative D; Table 4-8), with the goal of improving vegetation structure and composition, as well as reducing fire return intervals and fire size.

TABLE 4-8. VEGETATION COVER TYPES AND THEIR ACREAGES IN THE POCATELLO FIELD OFFICE (PFO)

Cover type	Total Acres in PFO	Alternatives (footprint-acres)[1]			
		A[2]	B[3]	C	D
Low-elevation Shrub	38,244	0	0	2,700	18,950
Perennial Grass	108,255	0	1,300	53,300	50,200
Annual Grass	33	0	0	33	0
Mid-elevation Shrub	143,599	0	5,700	102,000	21,900
Juniper	26,102	0	3,500	18,000	10,650
Salt Desert Shrub	346	0	0	0	0
Aspen/Conifer	40,395	1,600	7,000	4,391	0
Dry Conifer	49,022	1,800	6,200	5,366	0
Mountain Shrub	186,869	0	16,600	15,000	16,500
Wet/Cold Conifer	679	0	0	66	0
Vegetated Rock/Lava	16,386	0	0	200	0
TOTAL	**609,930**	**3,400**	**40,300**	**201,056**	**118,200**

[1] Footprint-acres describe broad treatment levels over 10 years for rehabilitation and restoration.
[2] Alternative A is the No Action Alternative, which would continue present management direction.
[3] Alternative B is the Proposed Action Alternative.

Since little of the Low-elevation Shrub in the PFO has been converted to Annual Grass, treatments in the area would focus on: 1) diversifying Perennial Grass to speed reestablishment of sagebrush cover types and 2) enhancing structural and species diversity in degraded sagebrush steppe cover types. Treatments in Perennial Grass would consist primarily of reseeding sagebrush into acres burned either by RxFire or by WFU. Aerial seeding of sagebrush would have negligible impacts on native vegetation. Fire would have a short-term impact of removing dried biomass. However, grassland fires rarely burn at high intensity; therefore mortality of herbaceous plants and resprouting shrubs is unlikely, and recovery would likely occur the following growing season.

Some Low-elevation Shrub would undoubtedly burn and be treated through seeding sagebrush, grasses and forbs to speed succession back to shrub-steppe. Areas where cheatgrass has become established would also be seeded with sagebrush, grasses and forbs to restore a healthy herbaceous understory. Chemical treatments would be used to control cheatgrass and noxious weeds. Short-term effects of treatments would be mortality of non-target plants from herbicide use and seeding methods that cause soil surface disturbance.

While Alternative B would treat the fewest acres (see Table 4-8) and have the smallest short-term impacts, Alternatives C and D would treat large acreages and restore sagebrush to large areas of Perennial Grass; Alternative C would be slightly more aggressive than Alternative D. Both alternatives would also treat or rehabilitate existing sagebrush steppe, although Alternative D would treat more acreage than Alternative C. Alternative B would treat less than 2 percent of the acreages proposed in either

Alternative C or D. Alternative A would not propose any treatments within these cover types.

4.2.2.1.2 Long-term Effects

Long-term effects of treatments applied to poor condition Low-elevation Shrub would be positive, resulting in cover types with sagebrush canopy and a diverse, perennial understory. Alternatives C and D would treat approximately 7 percent and 50 percent of this cover type, respectively, much of which is lacking in a perennial understory and is at risk of encroachment by cheatgrass. Alternative D would make the most progress towards creating a more resilient landscape. Alternative A and Alternative B would do nothing to improve or rehabilitate Low-elevation Shrub in the PFO.

Treatments applied to Perennial Grass would have long-term positive effects due to reestablishment of a sagebrush component. Alternatives C and D treat large areas of this cover type, 49 percent and 46 percent, respectively (see Table 4-8). Both alternatives would reestablish sagebrush on approximately half the existing Perennial Grass, thereby moving those acres to a later seral state. Alternative A would do nothing to speed reestablishment of sagebrush.

Treatments for Annual Grass, Perennial Grass, and Low-elevation Shrub would be applied with the intent of moving these types towards a DFC that consists of a mix of desirable seral states with minimal composition of uncharacteristic vegetation (Table 4-9). Alternatives C and D would be most effective of minimizing cheatgrass, but do not necessarily move desired vegetation towards DFC. However, it appears that both alternatives would result in a relatively even mix of seral states across the landscape, in addition to minimizing uncharacteristic vegetation. Alternative A and Alternative B also result in a relatively even mix of desired seral states; however, these alternatives would not reduce cheatgrass, which would have 35 percent and 34 percent coverage, respectively.

TABLE 4-9. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR LOW-ELEVATION SHRUB, PERENNIAL GRASS, AND ANNUAL GRASS, POCATELLO FIELD OFFICE (PFO)

Years Since Last Disturbance[1]	DFC	Current	Alternatives Over 30 Years			
			A[3]	B[4]	C	D
Perennial Grass <15-year	14%	32%	18%	18%	35%	25%
Grass/Shrub 15-30-year	14	5	17	18	31	36
Shrub/Grass >30-year	52	24	20	20	22	25
Crested Wheatgrass	N/A[5]	10	10	10	10	10
Cheatgrass[2]	<20	29	35	34	2	4

[1] Disturbance = Wildland fire, RxFire, mechanical, chemical, and seeding treatments.

[2] Although absence of cheatgrass is desirable, these percentages have been deemed acceptable, since complete eradication of cheatgrass is impossible.

[3] Alternative A is the No Action Alternative, which would continue present management direction.

[4] Alternative B is the Proposed Action alternative.

[5] Not applicable; no DFC was set for Crested wheatgrass because no treatments are proposed for these areas.

All alternatives would maintain the current condition in FRCC 2 after 30 years (Figure 4-7). Alternatives A, B, and C would maintain fire rotation within the range of historical variability, while Alternative D would lengthen the fire rotation beyond the historical rotation. Alternatives B, C, and D would create a more desirable mix of successional stages across the landscape by reducing vegetation and fuels departure from historical variability. Lengthened fire rotations under Alternative D would permit the development of a desirable mix of successional stages to recreate sagebrush steppe habitats. Alternatives C and D would most reduce cheatgrass. Alternative A and Alternative B would permit an increase in cheatgrass over current levels (see Table 4-9) as a consequence of relatively small treatment levels; once a cheatgrass threshold is reached, progress towards the vegetation/fuel DFC and FRCC 1 would cease.

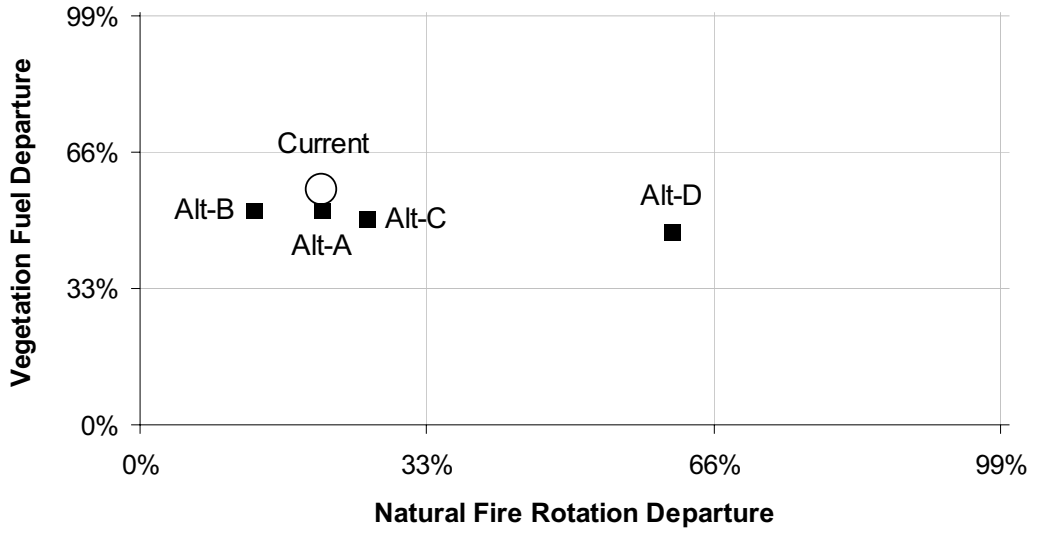

Figure 4-7. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Low-elevation Shrub, Perennial Grass, and Annual Grass in the Pocatello Field Office (PFO).

Note: FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

4.2.2.2 Mid-elevation Shrub and Juniper

4.2.2.2.1 Short-term Effects

Alternative treatment levels for these cover types of the PFO range from 0 acres (Alternative A) to approximately 120,000 acres (Alternative C) of Mid-elevation Shrub and Juniper, which includes areas of juniper encroachment (see Table 4-8) with the goal of improving vegetation structure and composition, as well as reintroducing fire in areas where juniper encroachment is a problem.

The Mid-elevation Shrub cover type has been affected by reduced fire frequencies. This has increased shrub and juniper densities, reduced the herbaceous understory, and

reduced the extent of high-quality sagebrush habitats. Treatments would focus on increasing disturbances to mimic historical wildland fire through RxFire and WFU, as well as mechanical methods to reduce shrub and juniper density. Areas with invasive or noxious weeds would receive chemical treatments to reduce or eliminate infestations. Chemical treatments would also be used for selective thinning of shrub cover or to eliminate immature encroaching junipers. Seeding could occur after fire and/or mechanical treatments in areas where the understory has been depleted.

Short-term effects of RxFire and WFUs would be reductions of shrub and tree canopies, as well as temporary reductions in herbaceous cover. Wildland fire could result in greater mortality and more continuous removal of canopy due to higher heat intensities than RxFires. Since herbaceous cover, particularly among annual species, could increase within two growing seasons following a fire, chemicals or other forms of integrated weed control would be used to control these undesirable plants. Chemical treatments could result in the mortality of non-target species.

Mechanical treatments would be used in areas or situations where RxFire or WFU is not appropriate or effective, or where selective vegetation removal is desired. Mechanical treatments would have little short-term effect on non-target plants, due to the specificity of the treatments on target vegetation. One exception would be damage to shallow-rooted species when using chaining or a Dixie harrow. Seeding methods that result in soil surface disturbances (drilling, chaining, and harrowing) could result in similar disturbances. However, seeding of grasses and forbs utilizing these methods would be conducted primarily where the understory is depleted; therefore the negative impacts would be minimal.

Alternative A would treat none of these cover types (see Table 4-8) and would have no short-term impacts. However, Alternative A would do nothing to control juniper encroachment in Juniper or to restore landscape-level structural diversity in Mid-elevation Shrub. Alternative B would only treat approximately 5 percent of these cover types and would result in little short-term impact. By contrast, Alternative C would treat approximately 71 percent of the total acreage, or approximately 12,000 acres annually, with the goal of restoring historical fire-return intervals at a landscape scale. Alternative D would treat approximately 19 percent of the total acreage or approximately 3,300 acres annually, which would result in relatively minor short-term impacts on a landscape scale.

4.2.2.2.2 Long-term Effects

Treatments applied to Mid-elevation Shrub and areas of juniper encroachment within Juniper would have long-term positive effects due to increasing the diversification of cover type structure and composition. Alternatives C and D would be equally effective in moving the mix of desirable successional states towards DFC, although both alternatives would fall short of achieving that goal (Table 4-10). Similarly, both alternatives would have approximately the same impacts on uncharacteristic vegetation – while not meeting DFC, both juniper invasion and cheatgrass landscape composition would be maintained at less than 10 percent. Therefore Alternatives C and D would be equally effective, even in the long term, though Alternative D would treat only approximately 27 percent of the acreage proposed in Alternative C.

Neither Alternative A nor Alternative B would substantially move these cover types towards DFC. Both alternatives achieve little change towards the desired mix of age classes/seral states. Uncharacteristic vegetation would actually increase under these alternatives due to lack of treatment.

TABLE 4-10. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR MID-ELEVATION SHRUB AND JUNIPER, POCATELLO FIELD OFFICE (PFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[2]	B[3]	C	D
Perennial Grass <15-year	23%	16%	11%	11%	12%	12%
Grass/shrub 5-15-year	45	7	7	10	26	27
Shrub/Grass >15-year	23	61	60	58	46	46
Juniper	7	11	15	14	10	9
Cheatgrass	2	5	7	7	6	6

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.

[2] Alternative A is the No Action Alternative, which would continue present management direction.

[3] Alternative B is the Proposed Action Alternative.

All alternatives would treat Mid-elevation Shrub and Juniper with the intention of moving these cover types to FRCC 1 (Figure 4-8). Alternative A and Alternative B would maintain FRCC 3 with fire rotations less than the historical rotation, which would permit increases in fuel accumulation; dominance of old, decadent shrubs; increased juniper densities; and/or conversion of Mid-elevation Shrub to Juniper. Increased juniper densities would also increase fire hazard by supporting larger, more intense and severe wildland fires.

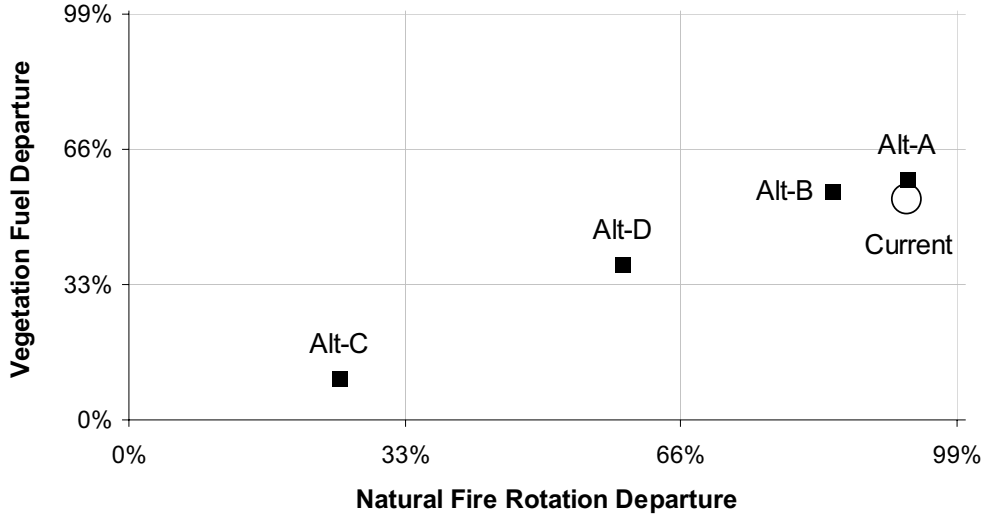

Figure 4-8. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Mid-elevation Shrub and Juniper in the Pocatello Field Office (PFO).

Note: FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

Alternative D would move the current condition to FRCC 2. Treatment levels for this alternative would more closely approximate the historical fire rotation compared to Alternative A and Alternative B. However, Alternative D would not propose enough treatment to create the desired mix of successional stages across the landscape in 30 years. Alternative C would achieve FRCC 1 in 30 years. It would most closely approximate the historical fire rotation and would be the most effective alternative at creating a mix of successional stages across the landscape that approach DFC.

4.2.2.3 Salt Desert Shrub

There are no planned treatments in the Salt Desert Shrub type in the PFO.

4.2.2.4 Aspen/Conifer and Dry Conifer

4.2.2.4.1 Short-term Effects

Alternative treatment levels for these cover types range from 0 acres (Alternative D) to approximately 13,000 acres (Alternative B) of Aspen/Conifer and Dry Conifer (see Table 4-8), with the goal of rejuvenating aspen stands and creating a diversity of forest successional stages and associated forest structure and species composition across the landscape.

Short-term effects of restoration treatments in the Aspen/Conifer and Dry Conifer would result in a reduction of tree densities, decrease canopy cover, and increase in the amount of solar radiation reaching the understory vegetation and/or soil surface. Where RxFire or WFU would be applied, a temporary reduction in understory shrub, grass, and forb cover would occur. The vast majority of shrubs found in the understory of this cover type

resprout after fire and would provide structure and shade to the soil surface within a year or two following treatment. Perennial grasses and forbs would resprout or recolonize the area following treatment. Increased soil temperature, aspen root scarification, and/or a decrease in the number of older aspen trees would encourage aspen regeneration via resprouting or "suckering".

Alternative D would not treat any forest type, including Aspen/Conifer and Dry Conifer types, and would permit fuel accumulation in these cover types. Alternative A would treat the fewest acres (less than 4 percent of these cover types) and would produce relatively few short-term effects. Alternative B would treat the most acres (15 percent of these cover types) and would produce moderate short-term effects. Alternative C would treat an intermediate amount of acres (11 percent of these cover types) and would result in a moderate level of short-term effects.

4.2.2.4.2 Long-term Effects

Long-term effects of treatment in Aspen/Conifer and Dry Conifer are positive and would result in a diversity of forest successional stages across the landscape. Pure aspen stands would become larger and more numerous. Vegetation species richness across the landscape would increase as the proportion of forest successional stages becomes more even. The number of stands at high risk to forest insect and disease outbreaks and subsequent severe wildland fires would decrease.

A variety of treatments would be used in Aspen/Conifer and Dry Conifer types with the intention of moving these cover types towards a DFC consisting of a 40:40:20 mix of early, middle, and late successional forest cover types (Table 4-11). None of the alternatives would achieve DFC in 30 years; however, two of the alternatives would achieve a somewhat more even distribution of successional forest cover types across the landscape. Alternatives B and C would make progress towards the DFC while Alternative A and Alternative D would move away from DFC. Alternative B would increase the percentage of early and mid-successional forest and would decrease the percentage of late successional forest. Alternative C would slightly increase the early successional forest, slightly decrease late successional forest, and not increase mid-successional forest. Alternative D would decrease mid-successional forest and substantially increase late successional forest.

TABLE 4-11. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR ASPEN/CONIFER AND DRY CONIFER, POCATELLO FIELD OFFICE (PFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[2]	B[3]	C	D
Forb/grass with aspen trees/suckers, <25 years old	40%	2%	3%	6%	4%	2%
Aspen/Conifer/shrub mix, 25-50 years old	40	29	25	31	28	22
Conifer-dominated, >50 years old	20	69	72	63	68	76

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.
[2] Alternative A is the No Action Alternative, which would continue present management direction.
[3] Alternative B is the Proposed Action Alternative.

Alternative A and Alternative D would maintain FRCC 3 over 30 years while Alternatives C and B would achieve FRCC 2 within 30 years (Figure 4-9). Alternative D would not treat any Aspen/Conifer and Dry Conifer and departures from historical conditions would increase beyond current conditions.

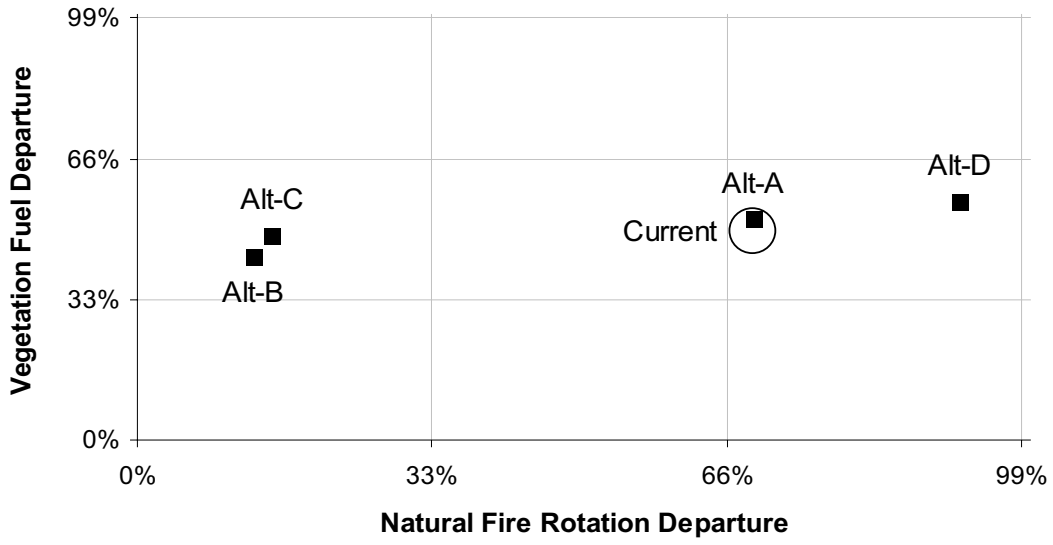

Figure 4-9. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Aspen/Conifer and Dry Conifer in the Pocatello Field Office (PFO).

Note: FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

Fire rotation under Alternative A and Alternative D would maintain rates less than historic, permitting fuel build-up. Continued suppression of fire in the Aspen/Conifer and Dry Conifer would permit an increase in the conifer component, an increase in tree densities, and forests with higher rates of insect attacks and disease. Forests composed of Dry Conifer with a litter understory would pose a greater fire hazard and burn with stand replacement severity unlike Aspen/Conifer with a grass/forb/shrub understory. After thirty years, Alternative A and Alternative D would increase late successional forest cover types (Dry Conifer) with little early successional stages and an intermediate proportion of mid-successional stages (Aspen/Conifer and Dry Conifer).

Alternatives B and C would achieve FRCC 2 within 30 years. The level of treatment in these alternatives would be aggressive and would result in a disturbance rate shorter than the historical fire rotation. With a shortened disturbance rate, the proportions of forest successional stages across the landscape would become unbalanced over time with an overabundance of early and mid-successional forest cover types and less-than-abundant, late successional forest cover types. In thirty years, Alternative B would make substantial progress toward the vegetation/fuels DFC; however, if the disturbance rate were to remain at this high level beyond the first decade, movement away from DFC would occur. Alternative C would also approximate historical fire rotation and improve the mix of successional forest cover types and vegetation and fuels structure and composition across the landscape.

4.2.2.5 Mountain Shrub

4.2.2.5.1 Short-term Effects

Alternative treatment levels for this cover type of the PFO range from 0 acres (Alternative A) to approximately 16,500 acres (Alternatives B and D) of Mountain Shrub (see Table 4-8), with the goals of rejuvenating old, decadent shrubs; increasing density and cover of desirable herbaceous species; reducing density and cover of uncharacteristic vegetation (i.e., cheatgrass and noxious weeds); and creating a diverse mosaic of successional stages across the landscape.

Treatments in Mountain Shrub are primarily RxFire and WFU. Short-term effects of restoration treatments would include a temporary decrease in shrub, grass, and forb canopy cover. Some individual shrubs could be killed (particularly true for antelope bitterbrush at lower elevations and mountain mahogany) in high severity fires. These changes would temporarily increase the amount of solar radiation reaching the soil surface, which would increase production by resprouting shrubs. The vast majority of mountain shrub species resprout after low- to moderate-severity fire and they would provide structure and shade to the soil surface within a year or two following treatment. Effects of fire on mountain mahogany however, could persist for a number of years (and perhaps into the long term) due to a general lack of resprouting. Perennial grasses and forbs would resprout or recolonize the treatment areas. Shrub leader growth would be vigorous following treatment due to increased light and soil temperatures as well as a reduction in standing, dead, woody material.

Alternative A would not treat any acres in this cover type and would have no short-term impacts. Alternative B and D would treat the most acres (9 percent of the cover type) and would have moderate short-term impacts. Alternative C would treat a similar number of

acres (8 percent of the cover type) that would also result in a moderate level of short-term effects.

4.2.2.5.2 Long-term Effects

Effects of treatment across alternatives in the Mountain Shrub cover type would be positive and would increase shrub successional diversity. Across the landscape, mountain shrub stands would become larger and more numerous. Vegetation species richness would increase as the proportions of shrub successional stages become even. The number of shrub stands at risk of severe wildland fire due to increased vegetation and fuels structure and composition would decrease.

Treatments in Mountain Shrub would be applied with the intention of moving this cover type towards a vegetation/fuels DFC consisting of a 33:33:34 mix of early, mid-, and late successional shrub cover types (Table 4-12). None of the alternatives would achieve DFC in 30 years; however, three of the four alternatives would achieve a more even distribution of shrub successional stages across the landscape. Alternative C would most closely approximate DFC, followed by Alternatives B and D, with higher percentages of early and mid-successional shrub cover types and lower percentages of late successional shrub cover types from current proportions. Alternative A would make very limited progress towards DFC by increasing early successional stages and slightly decreasing late successional stages.

TABLE 4-12. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR MOUNTAIN SHRUB, POCATELLO FIELD OFFICE (PFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[2]	B[3]	C	D
Perennial grass/shrub, <10 years old	33%	1%	10%	3%	15%	3%
Shrub/perennial grass, 10-20 years old	33	10	5	38	20	38
Shrub dominated, >20 years old	34	90	85	59	65	59

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.
[2] Alternative A is the No Action Alternative, which would continue present management direction.
[3] Alternative B is the Proposed Action Alternative.

Alternatives B, C, and D would achieve FRCC 1 within 30 years (Figure 4-10). Alternative A would maintain the current condition in FRCC 3 with fire rotation less than historical rates, which would permit dominance of old, decadent shrubs; depletion of understory species; and woody fuel build-up. Increased fuel accumulation would increase fire hazard by supporting larger, more intense and severe wildland fires. Under Alternatives B, C, and D, fire rotation would approximate the historical rate and would create the desired mix of successional stages across the landscape (vegetation/fuels DFC) and would have a disturbance rate similar to the historical fire rotation.

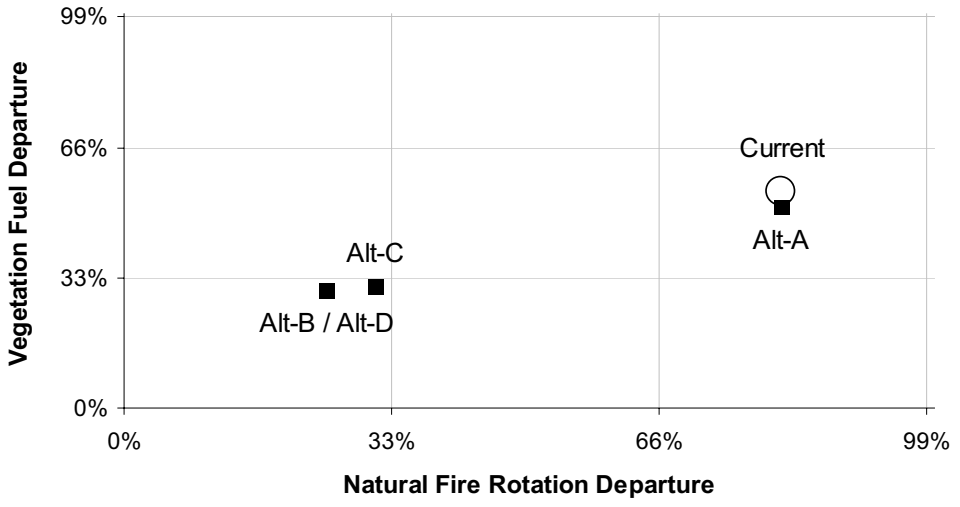

Figure 4-10. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Mountain Shrub in the Pocatello Field Office (PFO).

Note: FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

4.2.2.6 Wet/Cold Conifer

4.2.2.6.1 Short-term Effects

Alternative treatment levels for this cover type of the PFO range from 0 acres (Alternatives A, B, and D) to approximately 66 acres (Alternative C) of Wet/Cold Conifer with the goals of reducing risk of insect infestation and disease as well as creating a diversity of forest successional stages and associated forest structure across the landscape. In areas where private landowners are intermingled with the forest, the goal of treatment would be to reduce threats to life and property by reducing wildland fire intensity and spread.

Short-term effects of restoration treatments in the Wet/Cold Conifer would reduce tree densities, decrease canopy cover, and increase the amount of solar radiation reaching the understory vegetation and/or soil surface. Where mechanical treatments are used, a reduction in mature and pole-sized lodgepole pine and/or spruce/fir tree densities would occur. Where WFU treatments are used, overstory trees would be replaced by understory shrubs, grasses, and forbs. Lodgepole pines would reproduce and grow above the understory within approximately ten years following disturbance. Engelmann spruce and sub-alpine fir seedlings would begin to grow once the lodgepole pine canopy cover is established.

Alternatives A, B and D would not treat any acres for Wet/Cold Conifer and would have no short-term effects. Alternative C would treat approximately 10 percent of this cover type and have a low-level, short-term effect.

4.2.2.6.2 Long-term Effects

Effects of treatment across alternatives in the Wet/Cold Conifer cover type are positive and would result in more resilient forest stands and a diversity of forest successional stages across the landscape. Lodgepole pine and/or spruce/fir stands would become more capable of withstanding insect and disease outbreaks. Vegetation species richness across the landscape would increase as the proportion of forest successional stages becomes more even. In areas where private landowners are intermingled with the forest, the goal of treatment would be to reduce threats to life and property by reducing wildland fire intensity and spread.

Treatments in Wet/Cold Conifer type would be applied to moving towards a vegetation/fuels DFC consisting of a 30:44:26 mix of early, mid-, and late successional forest cover types (Table 4-13). None of the alternatives would achieve DFC in 30 years. Alternative C is the only alternative that would achieve a more even distribution of successional forest cover types across the landscape. This alternative would increase the percentage of early and mid-successional stages and decrease the percentage of late successional stages across the landscape. Alternatives A, B, and D would move the Wet/Cold Conifer type further from DFC than current conditions.

TABLE 4-13. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR WET/COLD CONIFER, POCATELLO FIELD OFFICE (PFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[2]	B[3]	C	D
Forb/grass with seedlings	30%	0%	0%	0%	22%	0%
Conifer shrub mix	44	10	8	8	17	8
Conifer-dominated	26	90	92	92	61	92

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.
[2] Alternative A is the No Action Alternative, which would continue present management direction.
[3] Alternative B is the Proposed Action Alternative.

None of the alternatives achieve FRCC 1 in Wet/Cold Conifer within 30 years (Figure 4-11). Alternatives A, B, and D would not treat this cover type; however, lack of treatments would not affect the current fire rotation or vegetation and fuels structure and composition within 30 years. Forests in this condition would have moderate to high stocking densities, substantial ladder fuels (e.g., small trees and overlapping deadfall), and moderate-to-widespread insect and disease outbreaks. Alternative C would apply treatments in this cover type and change conditions that approach but not achieve FRCC 1. Forests in this condition would have the desired mix of successional stages and fuel loadings close to DFC across the landscape. In Wildland Urban Interface areas, threats to life and property would be more fully mitigated by Alternative C than any of the other alternatives.

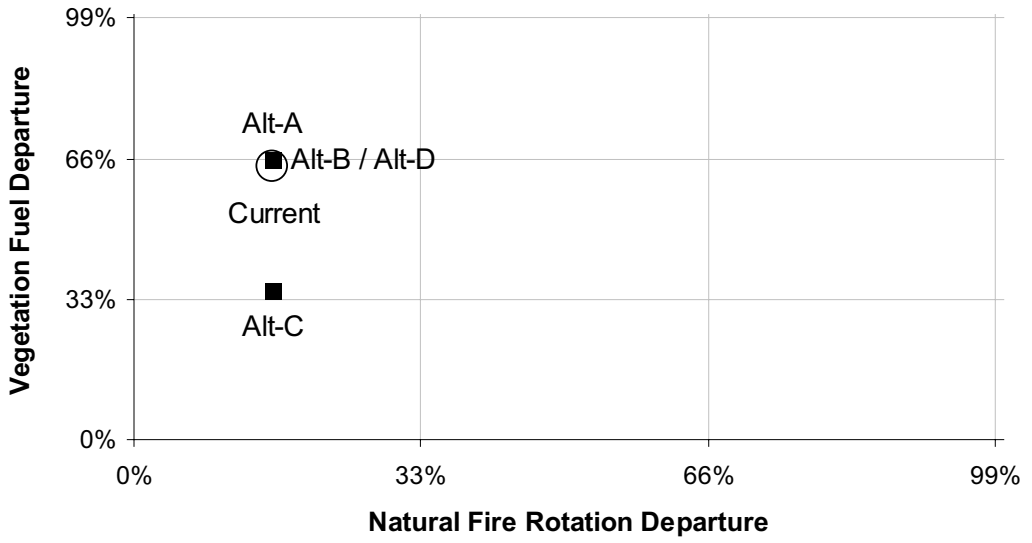

Figure 4-11. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Wet/Cold Conifer in the Pocatello Field Office (PFO).

Notes:

FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

Due to the lack of long-term fire history data for this cover type, the FRCC rating is based on vegetation/fuel departure. For clarity, departure from the historical fire rotation was positioned at the midpoint of FRCC 1.

4.2.2.7 Vegetated Rock/Lava

4.2.2.7.1 Short-term Effects

Alternative treatment levels for the Vegetated Rock/Lava cover type range from 0 acres (Alternatives A, B and D) to approximately 200 acres (Alternative C). These treatments would consist of WFU and chemical treatments to control noxious weeds.

Wildland fire would be allowed on Vegetated Rock/Lava under Alternative C, with only a minimal amount this cover type treated (see Table 4-8). Since fire starts on this cover type are infrequent, it is assumed that only a small fraction of the existing acreage would burn historically. Vegetated Rock/Lava is discontinuous and limited to areas with some soil development; therefore wildland fire would have minimal spread. Wildland fire is primarily allowed due to suppression difficulties. Cheatgrass is not a substantial problem in this vegetation, so wildland fires could be used to allow historical successional to occur mature and improve the vegetation. Noxious weed invasions, which are usually found near the edges of the Vegetated Rock/Lava, would be treated to prevent or reduce their spread.

Short-term effects would include the mortality of vegetation due to wildland fire. This would be most noticeable for long-lived shrubs and trees, such as Wyoming big sagebrush and junipers. Since vegetation is patchy, fire effects would also be discontinuous, creating openings in areas with dense concentrations of fuels.

4.2.2.7.2 Long-term Effects

With the exception of Alternative C, all alternatives would tend to slightly increase the proportion of early to mid-successional shrub/tree cover types while maintaining or slightly decreasing late successional shrub/tree cover types dominated by sagebrush and juniper (Table 4-14). Alternatives A, B, and D would move vegetation condition away from DFC while Alternative C would move it towards DFC by reducing the proportion of cheatgrass infested acreage.

TABLE 4-14. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR VEGETATED ROCK/LAVA, POCATELLO FIELD OFFICE (PFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[2]	B[3]	C	D
Perennial herbaceous	6%	7%	12%	12%	13%	12%
Tree/shrub/herbaceous	80	79	73	73	80	73
Cheatgrass	14	14	15	15	7	15

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.

[2] Alternative A is the No Action Alternative, which would continue present management direction.

[3] Alternative B is the Proposed Action Alternative.

Alternative C would apply treatments in the Vegetated Rock/Lava cover type with the intent of moving towards the desired FRCC 1 (Figure 4-12); due to a lack of long-term fire history data, departure from the historical fire rotation was not calculated for this cover type. This FRCC rating is based entirely on vegetation/fuel departure, indicated along the y-axis in Figure 4-12. All alternatives would maintain the current condition in FRCC 1. Alternative C, however, would be the most successful at reducing the proportion of uncharacteristic vegetation (cheatgrass understory acreage).

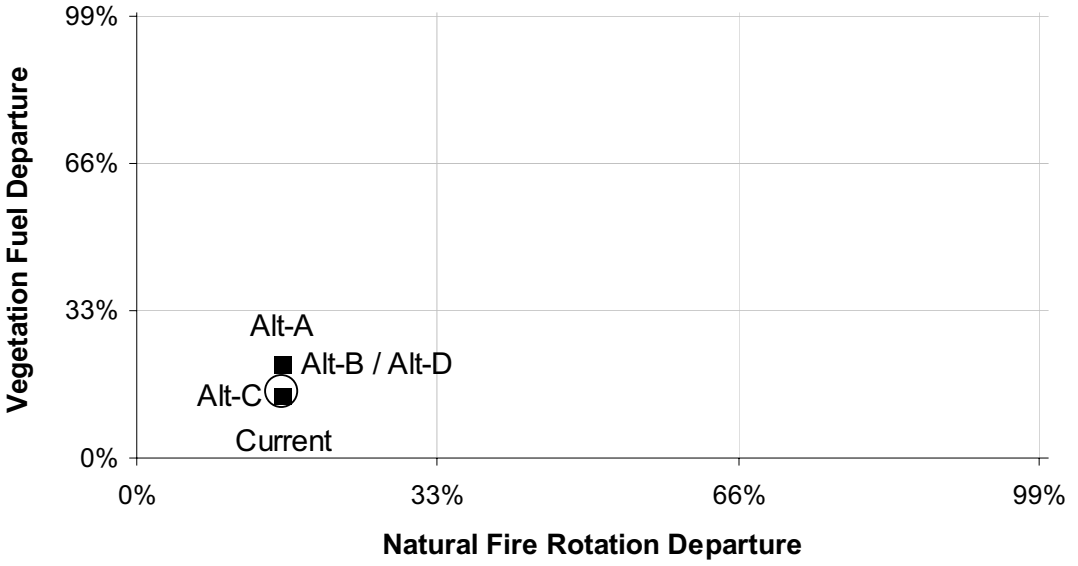

Figure 4-12. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Vegetated Rock/Lava in the Pocatello Field Office (PFO).

Note: FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

All alternatives would maintain this cover type in FRCC 1, but the proportion of early successional stages (perennial herbaceous) would increase from current conditions, moving away from DFC. Alternative C would result in the least departure from the vegetation/fuels DFC and the greatest reduction in cheatgrass.

4.2.3 Analysis of Effects for the Burley Field Office (BFO)

4.2.3.1 Low-elevation Shrub, Perennial Grass, and Annual Grass

4.2.3.1.1 Short-term Effects

Alternative treatment levels for these cover types range from approximately 50,000 acres (Alternative B) to 185,000 acres (Alternatives C and D) of potential or existing Low-elevation Shrub steppe (Table 4-15), with the goal of reducing fire return intervals and fire size.

TABLE 4-15. VEGETATION COVER TYPES AND THEIR ACREAGES IN THE BURLEY FIELD OFFICE (BFO)

Cover type	Total Acres in BFO	Alternatives (footprint-acres)[1]			
		A[2]	B[3]	C	D
Low-elevation Shrub	164,756	25,175	15,750	26,300	29,300
Perennial Grass	309,128	57,625	9,600	109,600	107,300
Annual Grass	49,150	15,925	24,850	49,069	48,850
Mid-elevation Shrub	162,524	7,575	14,200	106,063	72,500
Juniper	59,480	800	24,650	39,229	17,600
Salt Desert Shrub	10,037	975	0	0	0
Aspen/Conifer	1,177	0	500	147	0
Dry Conifer	373	0	0	46	0
Mountain Shrub	128,091	2,625	0	12,000	0
Wet/Cold Conifer	804	0	0	46	0
Vegetated Rock/Lava	94,090	3,350	0	1,500	0
TOTAL	**979,610**	**114,050**	**89,550**	**344,000**	**275,550**

[1] Footprint-acres describe broad treatment levels over 10 years for rehabilitation and restoration.
[2] Alternative A is the No Action Alternative, which would continue present management direction.
[3] Alternative B is the Proposed Action Alternative.

Some of the Low-elevation Shrub in the BFO area has been converted to Annual Grass by degradation of sagebrush steppe, invasion of cheatgrass, and frequent fires. Short-term effects of restoration treatments in Annual Grass are mainly mortality of non-target plants from herbicide use and seeding methods that cause soil surface disturbance. These treatments would follow RxFire or WFUs to prevent the perpetuation of Annual Grass. Considering the ecologically altered condition of Annual Grass, the short-term negative impacts would be minimal, even when treatments occur at a large scale.

Alternative B would treat the fewest acres (see Table 4-15) and have the smallest short-term effects. Alternative A treatments would have an intermediate effect. Alternatives C and D would treat acreages large enough to stabilize landscape-level areas of degraded vegetation. Both of these alternatives would treat nearly all of the mapped Annual Grass in the BFO. Treatment of these areas would protect adjacent, intact, sagebrush steppe over both the short and long term (see discussion below). Alternative B would treat approximately half the Annual Grass and have an intermediate effect, while Alternative A would treat the least approximately of Annual Grass for the smallest effect and Alternatives C and D would treat almost all of Annual Grass for the largest effect.

Large acreages of Low-elevation Shrub in the BFO have lost their shrub component and have been converted to Perennial Grass. Treatment of perennial grass types would involve seeding sagebrush following fire to speed succession back to sagebrush steppe cover types. Because these seedings are done opportunistically following WFU and are aerially applied, there would essentially be no negative short-term impacts to existing vegetation.

Treatment of Low-elevation Shrub would result in slightly greater short-term impacts to existing vegetation. However, since the acreages treated in the BFO area would consist primarily of degraded cover types with little native understory, these effects would be relatively minor. Acreages burned by wildland fires would be rehabilitated to stabilize sites against noxious weed and exotic annual grass invasion.

Short-term effects of treatments in Low-elevation Shrub would be similar to those for Annual Grass with mortality of non-target plants from herbicide use and seeding methods that cause soil surface disturbance. Areas containing stands of old, even aged sagebrush could be mechanically treated to improve community structure. These treatments (e.g., thinning small areas using a Dixie harrow) would remove some older shrubs, as well as shallow-rooted plants. However, treatments would be done on small acreages and effects would occur in localized patches. All of the alternatives treat less than 20 percent of the Low-elevation Shrub and would have minimal short-term impacts. Alternative B would impact the least amount (approximately 10 percent) of Perennial Grass, while Alternative A would impact an intermediate level (19 percent); and Alternatives C and D would impact the most Perennial Grass, approximately 35 percent. Alternatives C and D would impact more than 99 percent of Annual Grass, while Alternative B would impact approximately 50 percent and Alternative A would impact approximately 32 percent of this undesirable cover type.

4.2.3.1.2 Long-term Effects

Effects of treatments in Low-elevation Shrub would be positive, resulting in cover types with sagebrush canopy and a diverse, perennial understory. Since little of the existing sagebrush steppe would be treated under any of the alternatives, effects on a landscape scale would be minimal. Alternative D would make the most progress towards creating more resilient cover types. Alternative B would do little to improve or rehabilitate the degraded Low-elevation Shrub cover types in this area.

Treatments applied to Perennial Grass would have long-term positive effects due to reestablishment of a sagebrush component. Alternatives C and D would seed sagebrush on approximately 35 percent of existing Perennial Grass. Alternative A would treat an intermediate level (approximately 19 percent) of this cover type, while Alternative B would treat the least amount of this cover type (approximately 3 percent) and would do little to enhance reestablishment of sagebrush on a landscape scale.

Long-term effects of treatment in Annual Grass are positive and result in the replacement of annual exotic plants with perennial grasses and forbs, and the reestablishment of a sagebrush overstory. Alternatives C and D both would treat adequate acreages to move Annual Grass towards a Perennial Grass and shrub cover type, as well as protect existing sagebrush steppe with strategically placed treatments (see Table 4-15). Alternative A and Alternative B would treat approximately one-third and one-half of the existing Annual Grass, respectively. These alternatives would treat smaller areas of landscape, which would do less to enhance or protect the Low-elevation Shrub.

Treatments would be applied with the intention of moving these three cover types towards a DFC that consists of a mix of desirable seral states with minimal composition of uncharacteristic vegetation (Table 4-16). None of the alternatives would achieve DFC in 30 years; however, all alternatives achieve a more even distribution of seral states

across the landscape. Alternatives C and D would decrease cheatgrass cover types over the landscape and achieve DFC. None of the alternatives actually move the Grass/Shrub >30 years stage, due to a continued occurrence of wildland fire on the landscape.

TABLE 4-16. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC) CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR LOW-ELEVATION SHRUB, PERENNIAL GRASS, AND ANNUAL GRASS, BURLEY FIELD OFFICE (BFO)

Years Since Last Disturbance[1]	DFC	Current	Alternatives Over 30 Years			
			A[3]	B[4]	C	D
Perennial Grass <15-year	14%	23%	26%	20%	27%	23%
Grass/Shrub 15-30-year	14	7	22	17	27	31
Shrub/Grass >30-year	52	22	12	15	21	21
Crested Wheatgrass	N/A[5]	15	15	15	15	15
Cheatgrass[2]	<20	33	25	33	10	10

[1] Disturbance = Wildland fire, RxFire, mechanical, chemical, and seeding treatments.

[2] Although absence of cheatgrass is desirable, these percentages have been deemed acceptable, since complete eradication of cheatgrass is impossible.

[3] Alternative A is the No Action Alternative, which would continue present management direction.

[4] Alternative B is the Proposed Action Alternative.

[5] Not applicable; no DFC was set for Crested wheatgrass because no treatments are proposed for these areas.

None of the alternatives achieve FRCC 1 in Low-elevation Shrub, Perennial Grass, and Annual Grass within 30 years (Figure 4-13). Alternative A and Alternative D would not make any appreciable improvement in fire rotation, though Alternative D would slightly improve vegetation and fuels structure and composition. Alternatives B and C would reduce the fire rotation interval to within the range of variability of the historical fire regime. Alternative C would achieve zero departure from the historical fire rotation. Neither alternative, however, would substantially improve vegetation and fuels structure and composition over current condition.

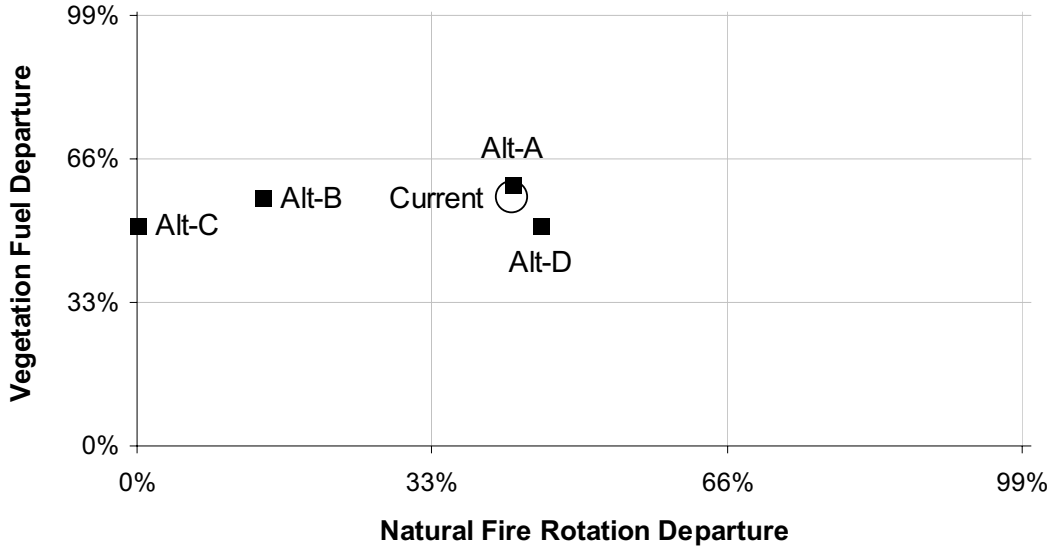

Figure 4-13. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Low-elevation Shrub, Perennial Grass, and Annual Grass in the Burley Field Office (BFO).

Note: FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

4.2.3.2 Mid-elevation Shrub and Juniper

4.2.3.2.1 Short-term Effects

Alternative treatment levels for these cover types of the BFO range from approximately 8,400 acres (Alternative A) to 145,000 acres (Alternative C) of Mid-elevation Shrub and Juniper (see Table 4-15), including areas of juniper encroachment. The goal is to improve vegetation structure and composition, as well as reintroducing fire in areas where juniper encroachment is a problem. In recognition of the unique value of pinion pine stands, there would be no treatment of pinion-juniper sites (fire-resistant) under any of the all four alternatives.

The Mid-elevation Shrub in the BFO has been affected by reduced fire frequencies. This has increased shrub and juniper densities, reduced the diversity and cover of herbaceous understory, and resulted in the loss of high-quality sagebrush habitats. Treatments would focus on increasing disturbance to mimic historical fire. This would be accomplished through RxFire and WFU, as well as mechanical methods, to reduce shrub and juniper densities. Areas with invasive or noxious weeds would receive chemical treatments to reduce or eliminate infestations. Chemical treatments would also be used for selective thinning of shrub cover or to eliminate immature encroaching junipers. Seeding could occur after fire and/or mechanical treatments in areas where the understory has been depleted.

Short-term effects of RxFire and WFU would reduce shrub and tree canopies and temporarily reduce herbaceous canopy. Wildland fire could result in greater mortality and

more continuous removal of canopy due to higher heat intensities than what occurs during RxFire. Herbaceous cover, particularly among annual species, should increase within two growing seasons following a fire. There could be an increase in invasive or noxious weeds on burned areas, requiring chemical or other forms of integrated weed control. Chemical treatments could result in the mortality of non-target species.

Mechanical treatments would be used in areas or situations where RxFire or WFU is not appropriate or effective, or where selective vegetation removal is desired. Mechanical treatments would have little short-term effect on non-target plants, due to the specificity of the treatments on target vegetation. One exception would be damage to shallow-rooted species when using chaining or a Dixie harrow. Seeding methods that result in soil surface disturbances (drilling, chaining, and harrowing) could result in similar disturbances. However, seeding of grasses and forbs utilizing these methods would be conducted primarily where the understory is depleted; therefore the negative impacts would be minimal.

Alternative A would treat the fewest acres over a 10-year period (approximately 4 percent of the total Mid-elevation Shrub and Juniper; see Table 4-15) and would have little short-term impact. This alternative, however, would do nothing to control juniper encroachment or to restore landscape-level structural diversity in Mid-elevation Shrub. Alternative B would treat approximately 18 percent of the total Mid-elevation Shrub and Juniper types, which would result in short-term impacts to approximately 3,900 acres annually. By contrast, Alternative C would treatment of approximately 65 percent of the total acreage over a 10-year period, or approximately 15,000 acres annually, with the goal of restoring historical fire-return intervals at a landscape scale. Alternative D would treat approximately 41 percent of the total acreage, or approximately 9,000 acres annually, causing intermediate effects that would fall between Alternatives B and C. However, Alternative D would allow treatment of landscape-level areas of vegetation.

4.2.3.2.2 Long-term Effects

Due to lack of recent fire, Mid-elevation Shrub in the BFO tends to be dominated by dense, even-aged sagebrush stands or areas of high juniper density. Treatments applied to Mid-elevation Shrub and areas of juniper encroachment within Juniper would have long-term positive effects due to diversification of cover type structure and composition.

Alternative C would be the most effective in moving the mix of desirable seral states towards DFC (Table 4-17) with Alternative D close behind. However, both alternatives would fall short of achieving DFC. Neither Alternative A nor B would make any substantial progress towards meeting DFC. None of the alternatives would effectively result in control of juniper invasion, although the Alternative C would be slightly better than the others. All of the alternatives would maintain cheatgrass composition over the landscape at less than 10 percent, although the only alternative that would meet DFC is Alternative D. Alternative A would actually allow an increase of uncharacteristic vegetation due to low levels of treatment.

TABLE 4-17. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR MID-ELEVATION SHRUB AND JUNIPER, BURLEY FIELD OFFICE (BFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[2]	B[3]	C	D
Perennial Grass <15-year	23%	1%	5%	7%	10%	10%
Grass/shrub 5-15-year	45	6	5	9	24	18
Shrub/Grass >15-year	23	63	55	56	40	48
Juniper	7	23	27	21	19	23
Cheatgrass	2	7	8	7	7	1

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.

[2] Alternative A is the No Action Alternative, which would continue present management direction.

[3] Alternative B is the Proposed Action Alternative.

Alternative A would maintain the current condition of Mid-elevation Shrub in FRCC 3 over 30 years (Figure 4-14). Alternatives B and D would achieve FRCC 2, while Alternative C would achieve FRCC 1 within 30 years. Alternative A and Alternative B would maintain fire rotation at less than historical rates, though Alternative B would shorten fire rotation better than Alternative A. Fire rotation greater than historical rotation would cause fuel accumulation; dominance of old, decadent shrubs; increased juniper densities; and/or conversion of Mid-elevation Shrub to Juniper. These would all contribute to an increased potential of larger, more intense, and more severe wildland fires.

Alternative D would move the current condition to FRCC 2 and approach FRCC 1. Treatments would lengthen the time between wildland fires and permit a more historical fire rotation. Treatments would also improve vegetation and fuels structure and composition over current conditions. There would not be sufficient treatments under Alternative D to create the desired mix of successional stages across the landscape (vegetation/fuels DFC) in 30 years. Alternative C, however, would achieve FRCC 1 in 30 years. Treatment levels in this alternative would most closely approximate the historical fire rotation and would be the most effective at creating the desired mix of successional stages across the landscape (vegetation/fuels DFC).

Figure 4-14. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Mid-elevation Shrub and Juniper encroachment in the Burley Field Office (BFO).

Note: FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

4.2.3.3 Salt Desert Shrub

4.2.3.3.1 Short-term Effects

Alternative treatment levels for this cover type of the BFO range from 0 acres (Alternatives B, C, and D) to approximately 1,000 acres (Alternative A) of Salt Desert Shrub (see Table 4-15), with the goal of controlling annual exotic annual grasses and noxious weeds, restoring a perennial herbaceous understory, and reducing fire return intervals through post-wildland fire rehabilitation.

Salt Desert Shrub in the BFO merges in places with the lowest precipitation areas of the Low-elevation Shrub. Soil chemistry, coupled with low precipitation (at or below an average of 8 inches annually) creates difficult conditions for rehabilitation and restoration. Salt Desert Shrub cover types would receive chemical treatments to reduce the cover of cheatgrass and noxious weeds (primarily halogeton), with some ES&R following wildland fire. Chemical treatments could result in the mortality of non-target species, depending on the chemical and concentration used. Seeding treatments that result in soil surface disturbance could result in the mortality of shallow-rooted species and the disturbance of biological soil crusts.

Only Alternative A would treat Salt Desert Shrub cover types in the BFO. These treatments would all be in the form of ES&R treatments following wildland fires. Treatments for chemical suppression of weedy species and seeding would impact approximately 10 percent of the total Salt Desert Shrub. The other alternatives would not treat Salt Desert Shrub and would have no impacts.

4.2.3.3.2 Long-term Effects

The present mix of desirable seral states for Salt Desert Shrub is reasonably near DFC. All alternatives would move the current condition towards DFC for the Perennial Grass/forb stage. Alternative A would reduce cheatgrass to slightly exceed DFC (Table 4-18). In this cover type; all alternatives are approximately equal in achieving later successional stages due to the slowness of ecological processes and plant growth. Only Alternative A would achieve DFC for composition of uncharacteristic vegetation. Treatments would decrease cheatgrass to less than 10 percent throughout the type.

TABLE 4-18. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR SALT DESERT SHRUB, BURLEY FIELD OFFICE (BFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[3]	B[4]	C	D
Perennial Grass and Forb	20%	11%	23%	13%	15%	14%
Shrub/Grass-Forb	76	75	69	69	68	68
Cheatgrass[2]	4	14	8	18	17	18

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.

[2] Although absence of cheatgrass is desirable, these percentages have been deemed acceptable, since complete eradication of cheatgrass is impossible.

[3] Alternative A is the No Action Alternative, which would continue present management direction.

[4] Alternative B is the Proposed Action Alternative.

Essentially, all alternatives would maintain Salt Desert Shrub in FRCC 1 even though Alternative A is the only alternative that would propose treatments (Figure 4-15). Vegetation and fuels tend to be sparse in this cover type. Ignitions are relatively rare and wildland fires are infrequent. Little wildland fire is expected to occur in this cover type over 30 years. Alternative A would treat a small portion of this Salt Desert Shrub (less than 10 percent; see Table 4-15). Alternative A would maintain fire rotation, reduce uncharacteristic cheatgrass, and improve the proportions of perennial shrubs and grasses.

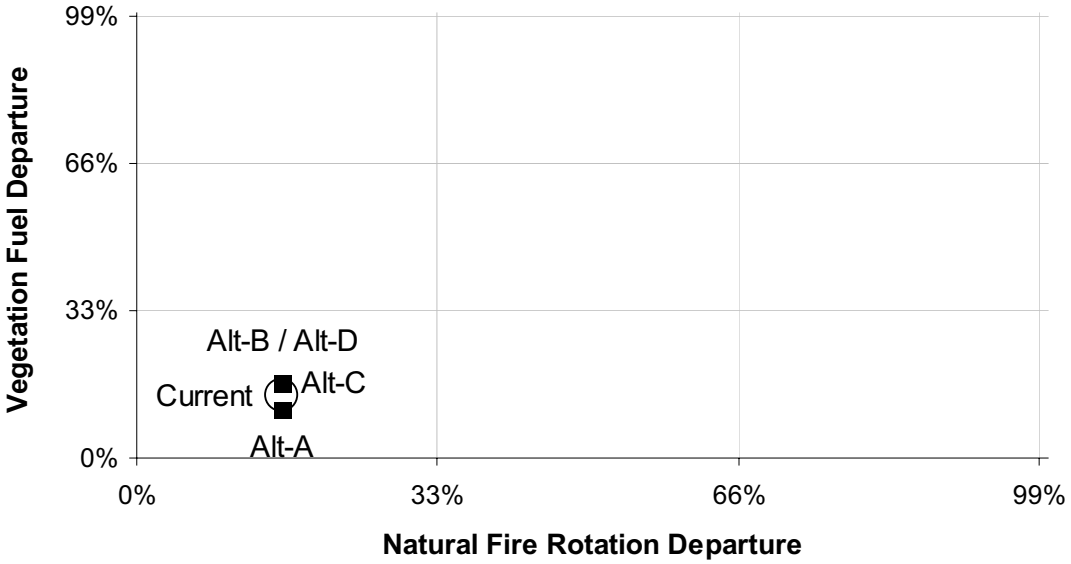

Figure 4-15. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Salt Desert Shrub in the Burley Field Office (BFO).

Notes:

FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

Due to the lack of long-term fire history data for this cover type, the FRCC rating is based on vegetation/fuel departure. For clarity, departure from the historical fire rotation was positioned at the midpoint of FRCC 1.

4.2.3.4 Aspen/Conifer and Dry Conifer

4.2.3.4.1 Short-term Effects

Alternative treatment levels for these cover types of the BFO range from 0 acres (Alternative A and Alternative D) to approximately 500 acres (Alternative B) of Aspen/Conifer and Dry Conifer (see Table 4-15) with the goal of rejuvenating aspen stands and creating a diversity of forest successional stages and associated forest structure and species composition across the landscape.

Short-term effects of restoration treatments in Aspen/Conifer and Dry Conifer would reduce tree densities, decrease overstory canopy cover, and increase the amount of solar radiation reaching the understory vegetation and/or soil surface. Where RxFire or WFU treatments are applied, a temporary reduction in understory shrub, grass, and forb cover would occur. The vast majority of shrubs found in the understory of this cover type resprout after fire and would provide structure and shade to the soil surface within a year or two following treatment. Perennial grasses and forbs would also resprout or recolonize the area following treatment. Increased soil temperature, aspen root scarification, and/or a decrease in the number of older aspen trees would encourage aspen regeneration via resprouting or "suckering."

The total acreage of Aspen/Conifer and Dry Conifer is minimal (approximately 1,550 acres) and occurs as scattered stands intermingled with Mountain Shrub. Because the

proposed treatment-acreages are quite small, substantial short-term effects would not be anticipated. Alternative A and Alternative D would not propose treatments in this cover type and produce have no short-term effects. Alternative B proposes the most treatments (32 percent of these cover types); however, due to the scattered nature of treatments, this alternative would also produce a low level of short-term effects. Alternative C proposes fewer treatments (13 percent of the cover type) and would produce few short-term effects.

4.2.3.4.2 Long-term Effects

Treatments in Aspen/Conifer and Dry Conifer would be positive and result in a greater diversity of forest successional stages across the landscape. This would improve the health of these cover types, including enhancement of structural and species diversity and decreased insect and disease outbreaks.

Treatments would move these cover types towards a DFC consisting of a 40:40:20 mix of early, mid-, and late successional stages (Table 4-19). None of the alternatives would achieve DFC within 30 years; however, treatments applied under Alternatives B and C would be equally effective in moving the vegetation towards DFC, particularly with regards to the proportion of mid-successional stages. The lack of treatments under Alternative A and Alternative D would result in a complete lack of early seral stages, a decrease in mid-seral, and an increase in the landscape-level proportion of late seral.

TABLE 4-19. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR ASPEN/CONIFER AND DRY CONIFER, BURLEY FIELD OFFICE (BFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[2]	B[3]	C	D
Forb/grass with aspen trees/suckers, <25 years old	40%	0%	0%	7%	7%	0%
Aspen/Conifer/shrub mix, 25-50 years old	40	30	25	43	43	22
Conifer-dominated, >50 years old	20	70	75	50	50	78

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.
[2] Alternative A is the No Action Alternative, which would continue present management direction.
[3] Alternative B is the Proposed Action Alternative.

Only Alternatives B and C would treat Aspen/Conifer and Dry Conifer; Alternative A and Alternative D would not propose any treatments in these cover types. Alternatives B and C would improve conditions to FRCC 2 and FRCC 1, respectively, within 30 years (Figure 4-16). Alternative A and Alternative D, on the other hand, would maintain current FRCC 3 over 30 years, even though they propose no treatments.

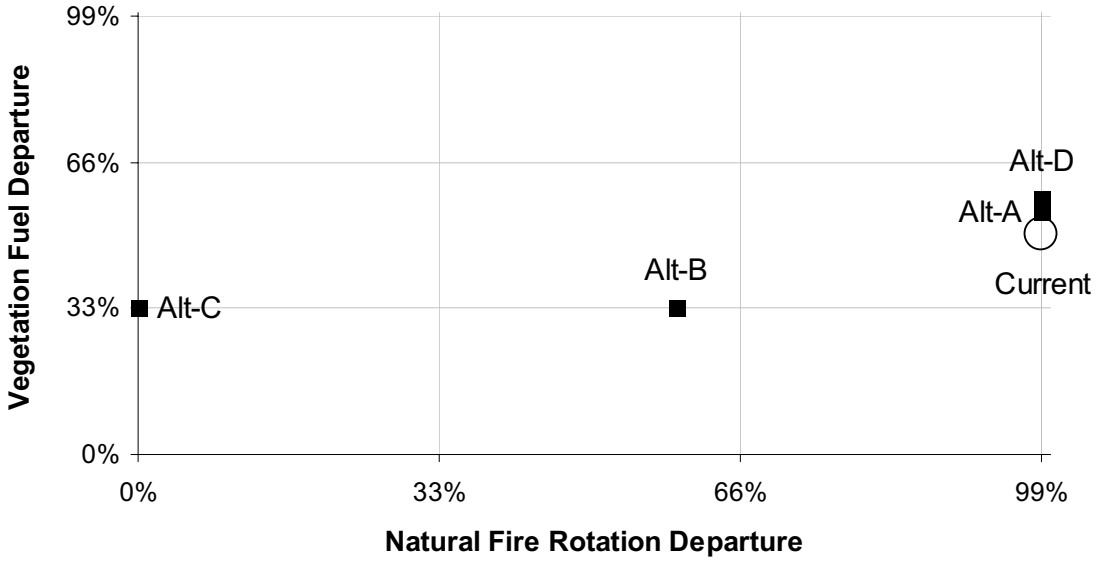

Figure 4-16. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Aspen/Conifer and Dry Conifer in the Burley Field Office (BFO).

Note: FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

Alternatives B and C would reduce departures of fire rotation and vegetation and fuels structure and composition and improve current conditions. Alternative C would achieve a historical fire rotation for these cover types as well as a small increase in early seral stages, a substantial increase in mid-seral stages near to DFC, and a decrease in late seral stages that would improve current conditions. Alternative B would achieve an intermediate fire rotation, but would improve vegetation and fuels structure and composition as well as Alternative C. Ten year treatment levels (see Table 4-15) would result in lower levels of vegetation fuel departure. Some successional stages would move through succession and reach the mid- and late seral stages again within 30 years.

4.2.3.5 Mountain Shrub

4.2.3.5.1 Short-term Effects

Alternative treatment levels for Mountain Shrub in the BFO range from approximately 0 acres (Alternatives B and D) to 12,000 acres (Alternative C; see Table 4-15), with the goals of rejuvenating old, decadent cover types or maintaining healthy cover types; increasing cover and density of desirable herbaceous species; reducing cover and density of uncharacteristic vegetation; and creating a mosaic of successional stages within cover types as well as the mosaic of Mountain Shrub with other cover types (e.g., Aspen/Conifer and Dry Conifer) across the landscape.

Treatments in this cover type would primarily be RxFire and WFU. Short-term effects of these treatments would be a temporary decrease in shrub, grass, and forb canopy cover. In the event of a high severity fire, individual shrubs could be killed (especially antelope bitterbrush, at lower elevations, and mountain mahogany). These changes would increase

the amount of solar radiation reaching the soils surface and stimulate resprouting and regrowth. The majority of mountain shrubs resprout after low-to-moderate-severity fire and would provide structure and shade to the soil surface within a year or two following treatment. Effects of fire on mountain mahogany however, could persist for a number of years (and perhaps into the long term) due to a general lack of resprouting. Perennial grasses and forbs would also resprout or recolonize the treatment areas. Shrub leader growth would increase due to increased light and soil temperatures, as well as a reduction in standing, dead, woody material.

Alternatives B and D propose no treatment-acres in this cover type and, therefore, would have no short-term effects (see Table 4-15). Alternative A proposes the fewest treatment-acres (2 percent of this cover type) would have minimal impacts at the landscape scale. Alternative C would treat approximately 9 percent of the total Mountain Shrub acreage, or approximately 1,200 acres annually. This would result in more substantial impacts than the other alternatives, primarily in the form of temporary removal of vegetative cover.

4.2.3.5.2 Long-term Effects

Treatment in Mountain Shrub would result in a greater structural and compositional diversity in this cover type. Species richness would increase as the proportion of different successional stages becomes more diverse. Landscape-level fuel loading would decrease with a decrease in dense, woody vegetation.

Treatments would move Mountain Shrub towards an even distribution of successional stages (Table 4-20). None of the alternatives would achieve DFC in 30 years. All alternatives would increase the proportion of early successional stages and decrease the proportion of late successional stages. However, only Alternative C would substantially move all three successional states towards a more even distribution. Treatment levels in Alternative A would essentially have the same effect as no treatment.

TABLE 4-20. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR MOUNTAIN SHRUB, BURLEY FIELD OFFICE (BFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[2]	B[3]	C	D
Perennial grass/shrub, <10 years old	33%	1%	9%	9%	13%	10%
Shrub/perennial grass, 10-20 years old	33	5	4	6	22	7
Shrub dominated, >20 years old	34	94	87	85	65	83

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.
[2] Alternative A is the No Action Alternative, which would continue present management direction.
[3] Alternative B is the Proposed Action Alternative.

Alternative A and Alternative C would treat Mountain Shrub, while Alternatives B and D would not treat this cover type. Alternative A would maintain current FRCC 1, while alternatives would achieve FRCC 2, and Alternative C would achieve FRCC 1 within 30 years (Figure 4-17). Alternative A would maintain the current fire rotation in this cover type, but not do much to improve vegetation and fuels structure and composition. Alternatives B and D would shorten the fire rotation in this cover type; departure from historical fire rotation would decrease to 40 percent for Alternative B, and to less than 10 percent for Alternative D. However, departure of vegetation and fuels structure and composition under these two alternatives would not decrease substantially within 30 years. Alternative C would substantially increase fire rotation over current conditions, and bring wildland fire regime within the historical range of variability. Of the four alternatives, Alternative C would create the best mix of successional stages across the landscape (vegetation/fuels DFC) and would have a disturbance rate most similar to the historical fire rotation.

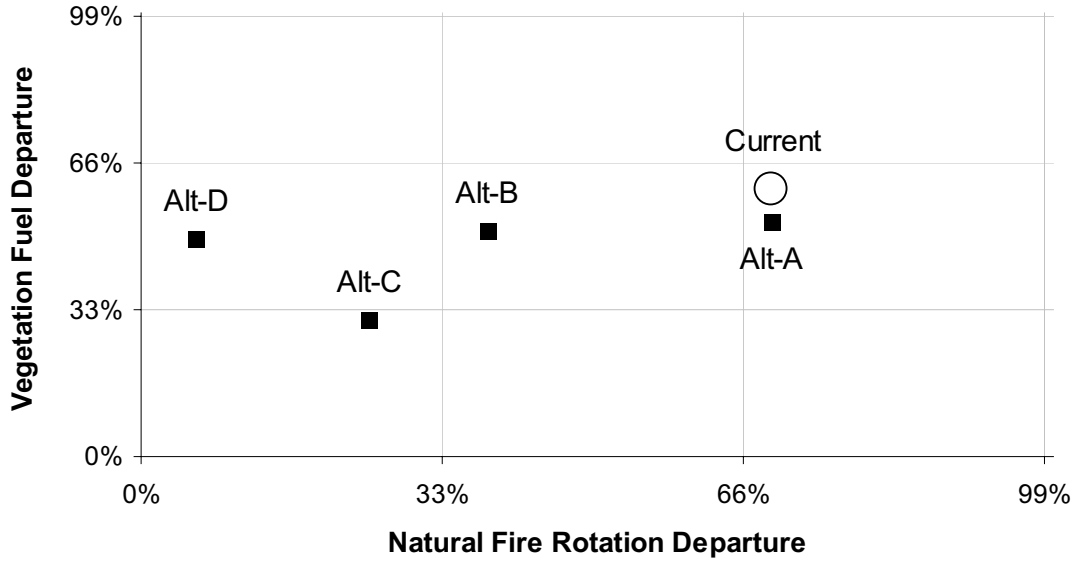

Figure 4-17. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Mountain Shrub in the Burley Field Office (BFO).

Note: FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

4.2.3.6 Wet/Cold Conifer

4.2.3.6.1 Short-term Effects

Alternative treatment levels for the Wet/Cold Conifer cover type range from 0 acres (Alternatives A, B, and D) to approximately 50 acres (Alternative C) over a 10 year period (see Table 4-15). Treatment goals include reducing the risk of insect infestation and disease, creating a more diverse mosaic of successional stages across the landscape, and reducing wildland fire intensity and spread.

Short-term effects of restoration treatments in Wet/Cold Conifer would reduce tree densities, decrease canopy cover, and increase the amount of solar radiation reaching the understory vegetation and/or soil surface. Mechanical treatments would result in a reduction in mature and pole-sized tree density. WFU treatments would remove overstory trees and increase understory shrubs, grasses, and forbs. Trees would regenerate and grow above the understory vegetation within approximately 10 years.

Alternatives A, B, and D would not treat Wet/Cold Conifer and would have no short-term effects (see Table 4-15). Alternative C would treat approximately 6 percent of this cover type. Short-term effects associated with Alternative C would be minimal due to the small acreages proposed for treatment.

4.2.3.6.2 Long-term Effects

Effects of treatments across alternatives in the Wet/Cold Conifer cover type would be positive and result in greater structural and compositional diversity, as well as resistance and resilience to fire disturbance, within the areas treated.

Treatments would move this cover type towards a DFC consisting of a 30:44:26 mix of early, mid-, and late successional forest cover types (Table 4-21). Alternatives A, B, and D would not treat this cover type, would not move the vegetation towards DFC, and would have no impacts in this cover type. Only Alternative C would treat this cover type though Alternative C would not meet DFC, but it would result in a more even distribution of successional stages across the landscape within 30 years.

TABLE 4-21. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR WET/COLD CONIFER, BURLEY FIELD OFFICE (BFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[2]	B[3]	C	D
Forb/grass with seedlings	30%	4%	7%	7%	30%	7%
Conifer shrub mix	44	10	9	9	17	9
Conifer-dominated	26	86	84	84	53	84

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.
[2] Alternative A is the No Action Alternative, which would continue present management direction.
[3] Alternative B is the Proposed Action Alternative.

Alternatives A, B, and D would not treat this cover type; however, lack of treatments would not affect the current fire rotation or vegetation and fuels structure and composition within 30 years (Figure 4-18). Forests in this condition would have moderate-to-high stocking densities, substantial ladder fuels (e.g., small trees and overlapping deadfall), and moderate-to-widespread insect and disease outbreaks. Alternative C, on the other hand, would achieve FRCC 1 within 30 years. Even though only approximately 6 percent of this cover type would be treated under Alternative C, treatment levels would be sufficient to increase fire rotation to historical rotation rates and improve vegetation and fuels structure and composition to closer approach DFC. Forests close to DFC would have the desired mix of successional stages and fuel loadings

across the landscape. In Wildland Urban Interface areas, threats to life and property would be more fully mitigated by Alternative C than any of the other three alternatives.

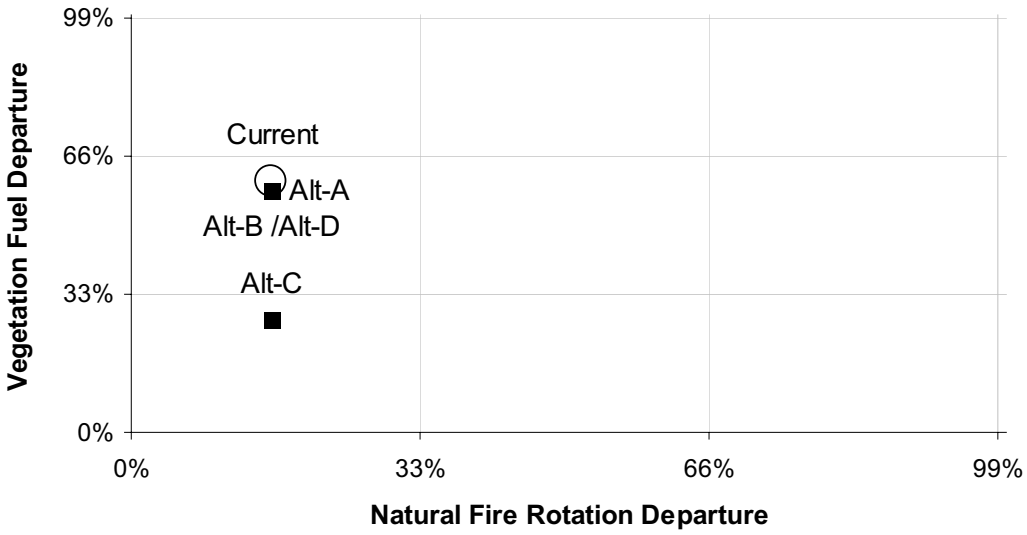

Figure 4-18. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Wet/Cold Conifer in the Burley Field Office (BFO).

Notes:

FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

Due to the lack of long-term fire history data for this cover type, the FRCC rating is based on vegetation/fuel departure. For clarity, departure from the historical fire rotation was positioned at the midpoint of FRCC 1.

4.2.3.7 Vegetated Rock/Lava

4.2.3.7.1 Short-term Effects

Alternative treatment levels for the Vegetated Rock/Lava type range from 0 acres (Alternatives B and D) to approximately 3,300 acres (Alternative A; see Table 4-15). These treatments would consist of WFU and chemical treatments to control noxious weeds.

WFU would be allowed on Vegetated Rock/Lava primarily in Alternative A and Alternative C (see Table 4-15). Since starts on this cover type are infrequent, it is assumed that only a small fraction of the existing acreage would burn. This vegetation is discontinuous and limited to areas with some soil development; therefore wildland fire would have minimal spread. Wildland fire would be allowed due primarily to suppression difficulties in this cover type. However, since cheatgrass is not a substantial problem in this type, WFU allows for historical successional processes to occur. Noxious weed invasions, usually found near the edges of the Vegetated Rock/Lava, would be treated to prevent or reduce spread.

Short-term effects would include the mortality of vegetation due to wildland fire. This would be most noticeable for long-lived shrubs and trees, such as Wyoming big

sagebrush and junipers. Since vegetation is patchy, fire effects would also be discontinuous, creating openings in areas with dense concentrations of fuels.

4.2.3.7.2 Long-term Effects

All alternative would move Vegetated Rock/Lava towards DFC (Table 4-22), with Alternative C being slightly best. Greater number acres burned in under Alternative A would result in a slightly greater proportion of this cover type being dominated by herbaceous cover types, lacking sagebrush and juniper. All the alternatives would keep composition of cheatgrass at or below 15 percent within this cover type; however, Alternative A and Alternative C would slightly decrease this proportion due to fire or chemical treatment.

TABLE 4-22. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR VEGETATED ROCK/LAVA, BURLEY FIELD OFFICE (BFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[2]	B[3]	C	D
Perennial herbaceous	6%	2%	10%	7%	7%	7%
Tree/shrub/herbaceous	80	84	79	78	80	78
Cheatgrass	14	14	11	15	13	15

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.
[2] Alternative A is the No Action Alternative, which would continue present management direction.
[3] Alternative B is the Proposed Action Alternative.

Alternative A and Alternative C would treat Vegetated Rock/Lava, while Alternatives B and D would not treat this cover type. All alternatives would maintain FRCC 1, while they slightly reduce departures from the historical fire rotation and vegetation and fuels structure and composition (Figure 4-19). All alternatives would slightly improve fire rotation, as well as improve vegetation and fuels structure and composition similar to DFC. Alternative A and Alternative C would apply proactive restoration treatments and allow for flexibility in Appropriate Management Response when suppressing fires in Vegetated Rock/Lava. Due to the small and fragmented nature of fire in this cover type, however, long-term changes in landscape composition and the resulting fuel and fire dynamics would be minimal.

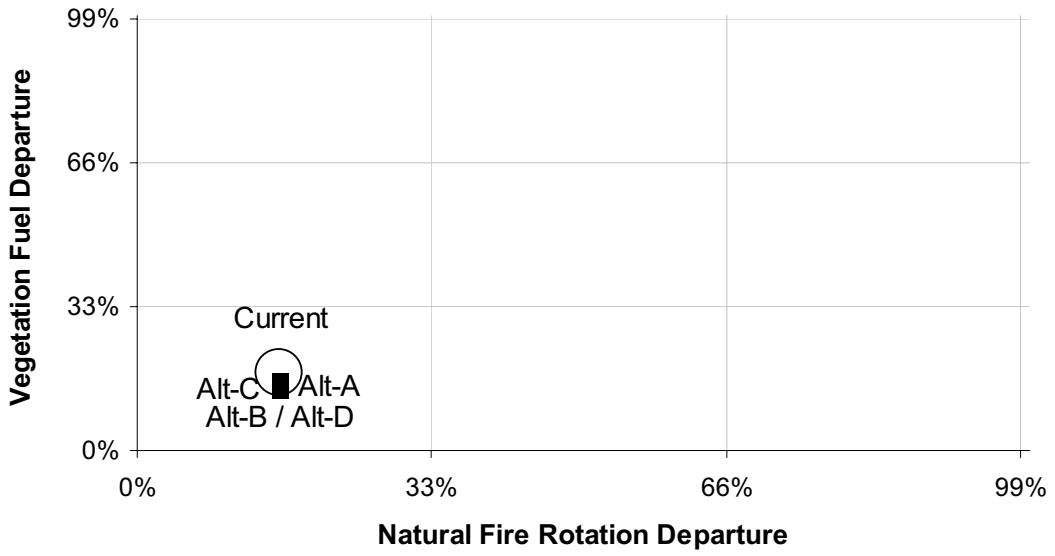

Figure 4-19. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Vegetated Rock/Lava in the Burley Field Office (BFO).

Notes:

FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

Due to the lack of long-term fire history data for this cover type, the FRCC rating is based on vegetation/fuel departure. For clarity, departure from the historical fire rotation was positioned at the midpoint of FRCC 1.

4.2.4 ANALYSIS OF EFFECTS FOR THE SHOSHONE FIELD OFFICE (SFO)

4.2.4.1 Low-elevation Shrub, Perennial Grass, and Annual Grass

4.2.4.1.1 Short-term Effects

Alternative treatment levels for these cover types of the SFO range from approximately 109,000 acres (Alternative A) to 534,000 acres (Alternative C) of potential or existing Low-elevation Shrub (Table 4-23), with the goal of reducing fire return intervals and fire size.

TABLE 4-23. VEGETATION COVER TYPES AND THEIR ACREAGES IN THE SHOSHONE FIELD OFFICE (SFO)

Cover type	Total Acres in SFO	Alternatives (footprint-acres)[1]			
		A[2]	B[3]	C	D
Low-elevation Shrub	415,308	5,525	84,000	62,831	112,230
Perennial Grass	548,807	96,505	70,500	193,619	113,500
Annual Grass	281,362	6,700	102,500	281,362	281,600
Mid-elevation Shrub	311,194	850	17,550	200,000	58,000
Juniper	4	0	0	0	0
Salt Desert Shrub	0	0	0	0	0
Aspen/Conifer	4,441	0	750	479	0
Dry Conifer	19,241	0	5,150	2,043	0
Mountain Shrub	11,901	0	550	1,345	550
Wet/Cold Conifer	9,388	0	0	793	0
Vegetated Rock/Lava	166,787	370	0	2,300	0
TOTAL	**1,768,433**	**109,950**	**281,000**	**744,772**	**565,880**

[1] Footprint-acres describe broad treatment levels over 10 years for rehabilitation and restoration.
[2] Alternative A is the No Action Alternative, which would continue present management direction.
[3] Alternative B is the Proposed Action Alternative.

Large acreages of Low-elevation Shrub have been converted to Annual Grass by invasion of cheatgrass and medusahead wildrye, frequent fires, and degradation of native cover types. Therefore most of the restoration and treatments are focused in the Annual Grass cover type. Short-term effects of restoration treatments are mainly mortality of non-target plants from herbicide use and seeding methods that cause soil surface disturbance. These treatments would follow RxFire and WFUs to prevent expansion of Annual Grass. Considering the overall poor ecological condition of areas that support Annual Grass, the short-term negative impacts are minimal, even when treatments occur at a large scale. While Alternative A treats the fewest acres (see Table 4-23) and would have the smallest short-term impacts, Alternatives C and D would treat acreages large enough to stabilize landscape-level areas of degraded vegetation. Placed correctly, large projects would protect adjacent, intact, sagebrush steppe, on both the short and long term (see discussion below).

Treatment of Perennial Grass involves seeding with sagebrush following fire to speed succession back to sagebrush steppe cover types, this cover type primarily consists of seedings established following past wildland fires and some native Perennial Grass areas that resulted from past fires in Mid-elevation Shrub. There would no negative short-term impacts from the former treatments, since aerial seedings are performed following wildland fires.

Treatment of Low-elevation Shrub would result in moderate short-term impacts, but since the acres primarily would be cover types with little native understory, these effects would be relatively minor.

Wildland fire burn areas would be rehabilitated to stabilize them against noxious weed and exotic annual grass invasion. Short-term effects of treatments would be similar to those for Annual Grass: the mortality of non-target plants from herbicide use and seeding methods that cause soil surface disturbance. Areas containing stands of old, even-aged sagebrush could be mechanically treated to improve cover type structure. These treatments (e.g., thinning small areas using a Dixie harrow) would remove some older shrubs, as well as shallow-rooted plants. However, the treatments would be done on small acreages; therefore effects would occur in localized patches.

4.2.4.1.2 Long-term Effects

Treatments in degraded Low-elevation Shrub would restore the sagebrush canopy and establish diverse, perennial understories. Alternatives C, B, and D would treat 15, 20, and 27 percent of this cover type, respectively, much of which is lacking a perennial understory and is either dominated by or at risk of dominance by cheatgrass and/or medusahead wildrye. Alternative D would make the most progress towards creating a more resilient landscape. Alternative A would do little to improve or rehabilitate the degraded Low-elevation Shrub cover types in this area.

Treatments in Perennial Grass would have long-term positive effects due to reestablishment of sagebrush canopy. Alternative C would treat the most acres (approximately 35 percent) of this cover type; over twice as many acres as Alternatives A (approximately 18 percent) and B (approximately 13 percent). Alternative D would treat approximately 21 percent. Alternative C would result in reestablishment of sagebrush on approximately 35 percent of existing Perennial Grass, and move the greatest number of acres towards a later seral state.

Long-term effects in Annual Grass are positive and would replace uncharacteristic, invasive annuals with perennial grasses, forbs, and a sagebrush overstory. Alternatives C and D would treat large acres, approximately 28,000 acres annually, to restore functional Low-elevation Shrub where annual grass exists (see Table 4-23). Alternative B would treat approximately 10,000 acres annually, and Alternative A would treat less than 1,000 acres annually. Alternatives B, C, and D would convert large areas of Annual Grass to sagebrush steppe, as well as protect existing sagebrush steppe. Both Alternatives C and D would restore all acreages currently mapped as Annual Grass. Alternative A would do little to enhance or protect the sagebrush steppe.

Treatments in Annual Grass, Perennial Grass, and Low-elevation Shrub would move these cover types towards a DFC, which would consist of a mix of desirable seral states and minimal uncharacteristic vegetation (Table 4-24). While all alternatives somewhat modify the distribution of desirable early and mid-seral states towards DFC, only Alternatives C and D would substantially decrease the dominance of cheatgrass, Alternative D would be slightly more effective than Alternative C. None of the alternatives actually move the Grass/Shrub >30 years state towards DFC. This would be due to the continued occurrence of wildland fires across the landscape.

TABLE 4-24. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR LOW-ELEVATION SHRUB, PERENNIAL GRASS, AND ANNUAL GRASS, SHOSHONE FIELD OFFICE (SFO)

Years Since Last Disturbance[1]	DFC	Current	Alternatives Over 30 Years			
			A[3]	B[4]	C	D
Perennial Grass <15-year	14%	3%	18%	9%	17%	18%
Grass/Shrub 15-30-year	14	2	5	15	12	21
Shrub/Grass >30-year	52	28	12	14	24	17
Crested Wheatgrass	N/A[5]	25	25	25	25	25
Cheatgrass[2]	<20	42	40	37	22	19

[1] Disturbance = Wildland fire, RxFire, mechanical, chemical, and seeding treatments.

[2] Although absence of cheatgrass is desirable, these percentages have been deemed acceptable, since complete eradication of cheatgrass is impossible.

[3] Alternative A is the No Action Alternative, which would continue present management direction.

[4] Alternative B is the Proposed Action Alternative.

[5] Not applicable; not DFC was set for Crested wheatgrass because no treatments are proposed for these areas.

All alternatives would maintain FRCC 2 over 30 years; no alternative would achieve FRCC 1 in Low-elevation Shrub, Perennial Grass, and Annual Grass cover types (Figure 4-20), though Alternatives B, C, and D would show improvement over current conditions. Alternative A would not treat enough of these cover types to change current conditions, though it would maintain current fire rotation and vegetation and fuels structure and composition. Alternative B would reduce the departure from the historical fire rotation, but would not substantially improve vegetation and fuels structure and composition, even though it would slightly reduce uncharacteristic cheatgrass.

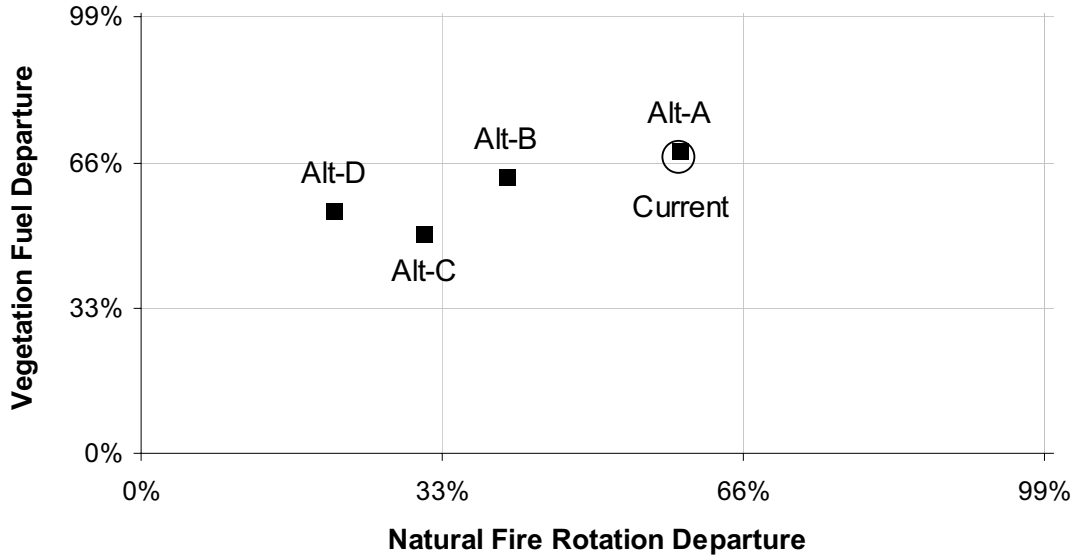

Figure 4-20. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Low-elevation Shrub, Perennial Grass, and Annual Grass in the Shoshone Field Office (SFO).

Note: FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

Alternatives C and D would reduce fire rotation departure sufficiently to approximate the historical fire rotation. Alternative D most closely approximates the historical fire rotation compared to the other alternatives and, given sufficient time, would achieve FRCC 1. However, neither alternative would reduce the vegetation/fuels departures sufficiently to achieve FRCC 1 in 30 years. Alternatives C and D make more or less similar progress in improving the vegetation and fuels structure and composition with a mix of successional stages, and substantially reduce the number of acres with uncharacteristic vegetation across the landscape. Alternative C would best improve the vegetation and fuels structure and composition by making large reductions in uncharacteristic cheatgrass (above) while increasing the proportion of early and mid-successional stages, though at the slight cost of reducing late successional stages.

4.2.4.2 Mid-elevation Shrub and Juniper

There are no planned treatments in the Juniper cover type in the SFO.

4.2.4.2.1 Short-term Effects

Alternative treatment levels for Mid-elevation Shrub range from 850 acres (Alternative A) to 200,000 acres (Alternative C) of (see Table 4-23), with the goal of improving vegetation structure and composition, as well as reintroducing fire at a more historical regime.

The Mid-elevation Shrub has been affected by reduced fire frequencies. This has increased shrub densities, reduced the diversity and cover of the herbaceous understory,

and reduced the extent of high-quality sagebrush habitats. Juniper only occurs as scattered trees in the SFO and does not present a threat to this cover type. Treatments would focus on increasing disturbance to mimic the effects of historical fire. Treatments would use RxFire and WFU, as well as mechanical methods, to reduce shrub densities. Areas with invasive or noxious weeds would receive chemical treatments to reduce or eliminate infestations. Chemical treatments would also be used for selective thinning of shrub cover. Seeding would occur after fire and/or mechanical treatments in areas where the understory has been depleted.

RxFire and WFU would reduce shrub and herbaceous canopy due to removal of biomass. Wildland fire could result in greater mortality and more continuous removal of canopy due to higher heat intensities than in RxFire. Herbaceous cover, particularly annual species, would increase within two growing seasons following fire. Chemical or other forms of integrated weed control would be used to minimize the expansion of invasive and noxious weeds. Chemical treatments could result in mortality of non-target species.

Mechanical treatments would be used where RxFire or WFU is not appropriate or effective, or where selective vegetation removal is desired. Mechanical treatments would have little short-term effect on non-target plants, due to the selectivity of the treatments on target vegetation. One exception would be damage to shallow-rooted species when using chaining or a Dixie harrow. Seeding methods that result in soil surface disturbances (drilling, chaining, and harrowing) could result in similar disturbances. However, seeding of grasses and forbs utilizing these methods would be performed where the understory is depleted; therefore the negative impacts would be minimal. Much of this cover type would be aerially seeded with negligible impacts.

Alternative A would treat the fewest acres (less than 1 percent of this cover type; see Table 4-23) and would have negligible short-term impacts. However, this alternative would do nothing to restore landscape-level structural diversity in the Mid-elevation Shrub. In contrast, Alternative C would treatment approximately 64 percent of this cover type, or approximately 20,000 acres annually, with the goal of restoring historical fire-return intervals at a landscape scale. Primarily, this would be accomplished with RxFire or WFU. Alternatives B and D would treat 6 percent and 19 percent of this cover type, respectively, and would have intermediate effects compared to Alternative A and Alternative C.

4.2.4.2.2 Long-term Effects

Treatments in Mid-elevation Shrub would diversify the vegetation structure and composition, which would be a positive effect over the long term. Alternative C is the most aggressive of the alternatives and would move the current vegetation towards DFC (Table 4-25); none of the alternatives, however, would actually achieve DFC in 30 years. All alternatives would decrease the proportion of early seral stages from the current 40 percent to percentages below DFC, and increase the proportion of mid-seral towards DFC. Alternatives A, B, and D would not reduce the proportion of late seral stages to DFC. The proportion of late seral stages would be maintained under Alternative C. All alternatives would allow an increase in Juniper while they would have little effect on cheatgrass conditions.

TABLE 4-25. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR MID-ELEVATION SHRUB JUNIPER, SHOSHONE FIELD OFFICE (SFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[3]	B[4]	C	D
Perennial Grass <15-year	23%	40%	10%	9%	12%	10%
Grass/shrub 5-15-year	45	2	17	18	26	21
Shrub/Grass >15-year	23	54	63	62	53	60
Juniper[2]	7	<1	7	7	6	6
Cheatgrass	2	3	3	4	3	3

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis..

[2] The SFO has only 4 acres of juniper invasion mapped in the area; the DFC listed is for the District as a whole.

[3] Alternative A is the No Action Alternative, which would continue present management direction.

[4] Alternative B is the Proposed Action Alternative.

Alternative A and Alternative B would maintain current FRCC 3, Alternative D would achieve FRCC 2, but only Alternative C would achieve FRCC 1 in Mid-elevation Shrub within 30 years (Figure 4-21).[1] Alternative A would treat a small proportion (less than 3 percent) of this cover type and maintain the current fire rotation and vegetation and fuels structure and composition conditions. Alternative B would reduce the fire rotation departure, but not substantially change the current vegetation and fuels structure and composition. For both Alternative A and Alternative B, fire rotation would continue at rates less than the historical rotation, which would permit accumulation of fuels; continued dominance of old, decadent shrubs; and a decline in desired herbaceous species. Neither alternative would make substantial progress towards achieving the desired mix of successional stages across the landscape (vegetation/fuels DFC).

[1] Only 4 acres of Juniper are mapped in the SFO, so there were no treatments proposed in Juniper by any of the four alternatives (see Table 4-23).

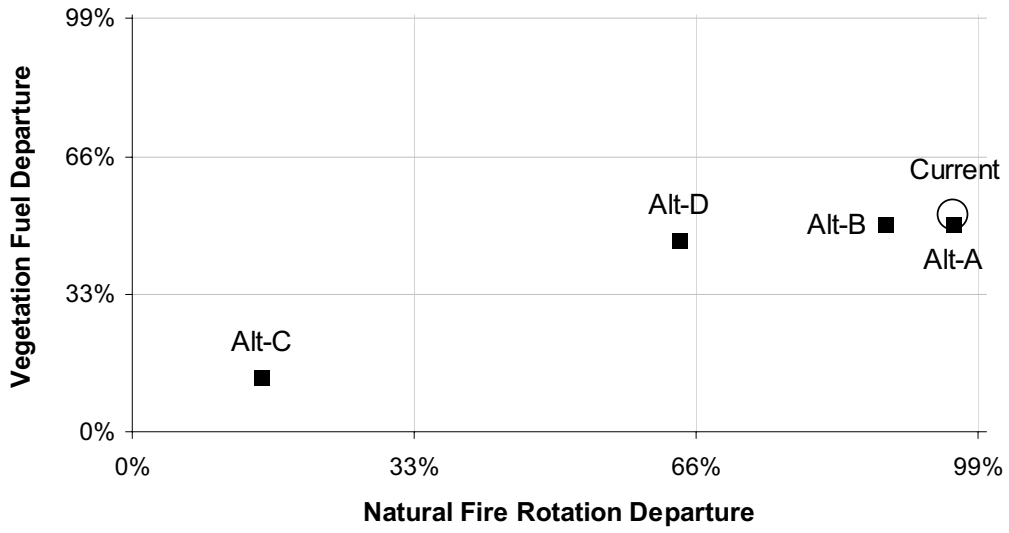

Figure 4-21. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Mid-elevation Shrub and Juniper encroachment in the Shoshone Field Office (SFO).

Note: FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

Alternative D would reduce the departure of fire rotation, but not appreciably reduce the current departure from vegetation and fuels structure and composition. Treatments would reduce early successional stages, increase mid-successional stages, and do little to change the proportion of uncharacteristic vegetation; however, Alternative D would also increase late successional stages, which could make these stands more prone to stand-replacing fires.

Alternative C would reduce departures of fire rotation and vegetation and fuels structure and composition to levels that approach historical conditions and DFC. Treatments would reduce early successional stages, increase mid-successional stages, maintain late successional stages, and do little to change the proportion of uncharacteristic vegetation. Treatment levels in this alternative would most closely approximate the historical fire rotation and would be the most effective at creating the desired mix of successional stages across the landscape (vegetation/fuels DFC).

4.2.4.3 Salt Desert Shrub

There are no planned treatments in the Salt Desert Shrub cover type in the SFO.

4.2.4.4 Aspen/Conifer and Dry Conifer

4.2.4.4.1 Short-term Effects

Alternative treatment levels for these cover types of the SFO range from 0 acres (Alternative A and Alternative D) to approximately 5,900 acres (Alternative B; see Table 4-23). Treatment goals would include rejuvenating aspen stands and creating a diversity

of forest successional stages and associated forest structure and species composition across the landscape.

Short-term effects of proactive restoration treatments in Aspen/Conifer and Dry Conifer would reduce tree densities, decrease canopy cover, and increase in the amount of solar radiation reaching the understory vegetation and/or soil surface. Where RxFire or WFU is applied, a temporary reduction in understory shrub, grass, and forb cover would occur. The vast majority of shrubs found in the understory of this cover type resprout after fire and would provide structure and shade to the soil surface within a year or two following treatment. Perennial grasses and forbs would also resprout or recolonize the area following treatment. Increased soil temperature, aspen root scarification, and/or a decrease in the number of older aspen trees would encourage aspen regeneration via resprouting or "suckering."

Alternative A and Alternative D would not treat any Aspen/Conifer or Dry Conifer and would have no short-term effects (see Table 4-23). Alternative C would treat the fewest acres (approximately 11 percent of this cover type or approximately 250 acres annually) and would produce few short-term effects due to small treatment-acreages. Alternative B proposes the highest treatment-acreage (approximately 25 percent of the cover type or approximately 600 acres annually). This would have a greater level of short-term treatment effects, particularly if all acres treated were in one area, but even these treatment levels are small in the SFO.

4.2.4.4.2 Long-term Effects

Treatment across alternatives in Aspen/Conifer and Dry Conifer would diversify the forest successional stages. Pure aspen stands would become larger and more numerous. Vegetation species richness would increase as the proportion of forest successional stages becomes more even. The number of stands at high risk to insect and disease outbreaks and subsequent severe wildland fire would decrease.

Treatments in Aspen/Conifer and Dry Conifer would move these cover types towards DFC consisting of a 40:40:20 mix of early, mid-, and late successional forest cover types (Table 4-26). None of the alternatives would achieve DFC in 30 years. No treatments would be applied under Alternative A and Alternative D and essentially no progress would be made towards DFC. Treatments applied under Alternatives B and C would result in some progress towards DFC, with increases in the proportion of early and mid-seral stages and decreases in late seral stages. Vegetation treated under Alternative B would progress more quickly towards DFC due to higher levels of treatment.

TABLE 4-26. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR ASPEN/CONIFER AND DRY CONIFER, SHOSHONE FIELD OFFICE (SFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[2]	B[3]	C	D
Forb/grass with aspen trees/suckers, <25 years old	40%	2%	2%	8%	6%	2%
Aspen/Conifer/shrub mix, 25-50 years old	40	29	30	37	34	30
Conifer-dominated, >50 years old	20	69	68	55	60	68

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.

[2] Alternative A is the No Action Alternative, which would continue present management direction.

[3] Alternative B is the Proposed Action Alternative.

Alternative A and Alternative D would not treat Aspen/Conifer and Dry Conifer cover types, while Alternatives B and C would treat them. Alternative A and Alternative D would maintain vegetation in FRCC 3 and Alternatives B and C would achieve FRCC 2 over 30 years (Figure 4-22). Under Alternative A and Alternative D, proportions of forest successional stages would continue to be unbalanced in favor of the late seral stage, moving away from the vegetation/fuels DFC. Fire rotation would be maintained at a rate less than historical, permitting fuel build-up. Exclusion of fire in Aspen/Conifer and Dry Conifer would permit an increase in conifer density (including conifers encroaching into aspen stands) and a greater incidence of insect infestations and disease. Late seral forests would pose a greater fire hazard than stands with mixed species and structural composition. Wildland fires in late seral, Dry Conifer stands would be larger and burn with higher intensities than mixed stands, often resulting in stand-replacing crown fires.

Alternative B would reduce departures of fire rotation and vegetation and fuels structure and composition. The levels of treatments would substantially improve fire rotation, but not achieve a historical fire rotation. However, the treatments would improve vegetation and fuels structure and composition to approach the historical range of DFC and increase the relative proportions of early and mid-seral stages across the landscape. The level of 10-year treatments would result in lower levels of vegetation fuels departure; however, some cover types would move through successional stages and reach the mid- and late seral stages again within 30 years.

Alternative C would reduce departure of fire rotation to within the historical range of variability (see Figure 4-22). Alternative C, however, would have little effect on current departure of vegetation and fuels structure and composition. While there would be a slight increase in early and mid-seral vegetation over the current conditions, the proportion of late seral vegetation would maintain currently high proportions of these

cover types. Alternative C would have a disturbance rate that is closer to the historical fire rotation and would make slower progress towards the vegetation/fuels DFC than Alternative B.

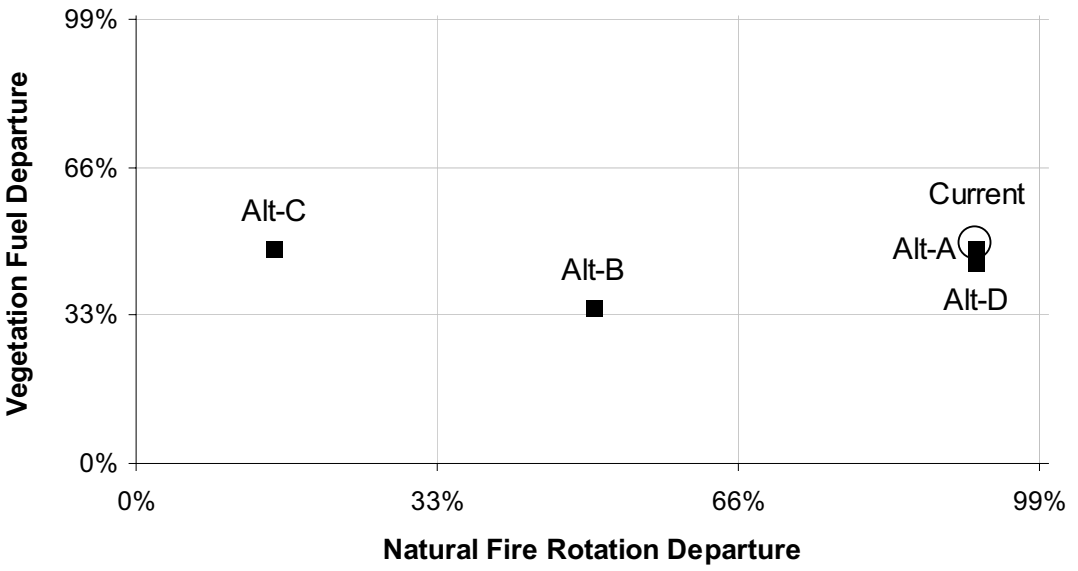

Figure 4-22. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Aspen/Conifer and Dry Conifer in the Shoshone Field Office (SFO).

Note: FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

4.2.4.5 Mountain Shrub

4.2.4.5.1 Short-term Effects

Alternative treatment levels for this cover type in the SFO range from 0 acres (Alternative A) to approximately 1,300 acres (Alternative C; see Table 4-23). Treatment goals include: rejuvenating old, decadent cover types or maintaining healthy cover types; increasing cover and density of desirable herbaceous species; reducing cover and density of uncharacteristic vegetation; and creating a mosaic of successional stages within cover types, as well as a mosaic of Mountain Shrub with other cover types (e.g., Aspen/Conifer and Dry Conifer) across the landscape.

RxFire and WFU would be used to treat this vegetation. Short-term effects of these treatments would include a temporary decrease in shrub, grass, and forb canopy cover. Individual shrubs could be killed by high-severity fires, especially antelope bitterbrush at lower elevations. These changes would increase the amount of solar radiation reaching the soil surface, which would stimulate resprouting and regrowth of shrubs. The majority of mountain shrubs resprout after low-to-moderate-severity fire and would provide structure and shade to the soil surface within a year or two following treatment. Perennial grasses and forbs would also resprout or recolonize the treatment areas. Shrub leader

growth would increase following treatment due to increased light and soil temperatures, as well as a reduction in standing, dead, woody material.

Alternative A proposes no treatment-acres in Mountain Shrub and would have no short-term effects (see Table 4-23). Alternatives B and D would treat the fewest acres, approximately 5 percent of this cover type. Impacts would be minimal at a landscape scale due to the small acreages treated over 10 years and on an annual basis. Alternative C would treat approximately 11 percent of this vegetation or approximately 130 acres annually. Effects from treatments proposed in Alternative C would be minimal; annual acreages would not be large. Most Mountain Shrub (e.g., buckbrush, snowberry, as well as herbaceous grasses and forbs) would provide good cover within one to two years.

4.2.4.5.2 Long-term Effects

The long-term effects of treatments in Mountain Shrub would be positive and increase structural and compositional diversity across the landscape. Vegetation species richness would increase as the proportion of different successional stages becomes more varied. Hazardous fuels would decrease across the landscape with a reduction in Mountain Shrub densities.

Treatments would move this cover type towards an even distribution of successional stages (Table 4-27). None of the alternatives would achieve DFC in 30 years. Alternatives A, B, and D would have little effect on early successional, mid-successional and late successional stages in this cover type. Alternatives B and D would do little to move the vegetation towards DFC. Only Alternative C would substantially move all three successional states towards a more even distribution and move this cover type towards DFC.

TABLE 4-27. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR MOUNTAIN SHRUB, SHOSHONE FIELD OFFICE (SFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[2]	B[3]	C	D
Perennial grass/shrub, <10 years old	33%	2%	5%	5%	12%	5%
Shrub/perennial grass, 10-20 years old	33	2	2	4	22	4
Shrub dominated, >20 years old	34	96	93	91	66	91

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.
[2] Alternative A is the No Action Alternative, which would continue present management direction.
[3] Alternative B is the Proposed Action Alternative.

Alternative A would not treat Mountain Shrub, while Alternatives B, C, and D would treat this cover type. Alternative A would maintain FRCC 3, Alternatives B and D would achieve FRCC 2, and Alternative C would achieve FRCC 1 in 30 years (Figure 4-23). Under Alternative A, departures of fire rotation and vegetation and fuels structure and

composition would be maintained over 30 years. Alternatives B and D, would reduce departures of fire rotation to approximately 60 percent though not so much as to achieve fire rotations within the range of historical variability. Alternative C would reduce the departure of fire rotation to within the range of historical variability.

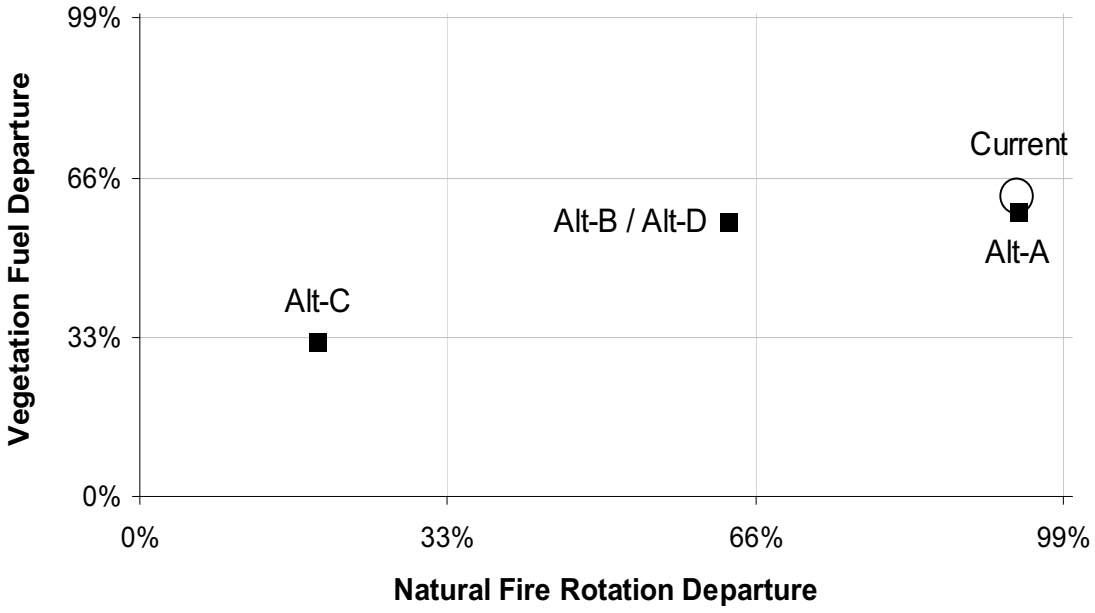

Figure 4-23. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Mountain Shrub in the Shoshone Field Office (SFO).

Note: FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

Alternatives B and D would not appreciably reduce the departure of vegetation and fuels structure and composition from current conditions. Alternatives A, B, and D would maintain the dominance of late seral stages, depletion of understory herbaceous species, and woody fuel build-up. Increased fuel accumulations would increase fire hazards by supporting larger, more intense and severe wildland fires. Alternative C, however, would reduce the departure of vegetation and fuels structure and composition so as to approach DFC by increasing early and mid-successional stages, while substantially reducing late seral stages. This alternative would most closely create the desired mix of successional stages across the landscape (vegetation/fuels DFC) and would have a disturbance rate most similar to the historical fire rotation.

4.2.4.6 Wet/Cold Conifer

4.2.4.6.1 Short-term Effects

Alternative treatment levels for this cover type in the SFO range from 0 acres (Alternatives A, B, and D) to approximately 800 acres (Alternative C) over a 10-year period (see Table 4-23). Treatment goals include reducing risk of insect infestation and

disease, creating a more diverse mosaic of successional stages across the landscape, and reducing wildland fire intensity and spread.

Short-term effects of proactive restoration treatments in Wet/Cold Conifer would reduce tree densities, decrease canopy cover, and increase the amount of solar radiation reaching the understory vegetation and/or soil surface. Mechanical treatments would reduce mature- and pole-sized tree densities. WFU treatments would remove overstory trees and increase understory shrubs, grasses, and forbs. Trees would regenerate and grow above the understory vegetation within approximately 10 years.

Alternatives A, B, and D would not treat Wet/Cold Conifer and would produce no short-term effects (see Table 4-23). Alternative C would treat approximately 9 percent of this cover type. Short-term effects would be minimal with Alternative C due to the small acreages proposed for treatment.

4.2.4.6.2 Long-term Effects

Effects of treatment across alternatives in Wet/Cold Conifer would be positive and increase structural and compositional diversity, as well as increase resistance and resilience to wildland fires.

Only Alternative C would treat this cover type. Treatments would be applied with the intention of moving the vegetation towards a DFC, which would consist of a 30:44:26 mix of early, mid-, and late successional forest cover types (Table 4-28). Alternatives A, B, and D do not propose treatments and would not move the vegetation towards DFC. While not achieving DFC, Alternative C would result in a more even distribution of successional stages across the landscape within 30 years.

TABLE 4-28. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR WET/COLD CONIFER, SHOSHONE FIELD OFFICE (SFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[2]	B[3]	C	D
Early, forb/grass with seedlings	30%	1%	2%	2%	25%	2%
Mid, conifer shrub mix	44	10	8	8	17	8
Late, conifer-dominated	26	89	90	90	58	90

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.
[2] Alternative A is the No Action Alternative, which would continue present management direction.
[3] Alternative B is the Proposed Action Alternative.

Alternatives A, B, and D would not treat Wet/Cold Conifer, while Alternative C would treat this cover type. Alternatives A, B, and D would maintain FRCC 2 and Alternative C would achieve FRCC 1 in this cover type within 30 years (Figure 4-24). Alternatives A, B, and D would maintain current fire rotation and vegetation and fuels structure and composition over 30 years. Alternative C, on the other hand, would substantially reduce departure of fire rotation to within the range of historical variability. Furthermore, this alternative would substantially reduce departure of vegetation and fuels structure and

composition to approach DFC. Treatments applied under this alternative would most closely create the desired mix of successional stages across the landscape (vegetation/fuels DFC).

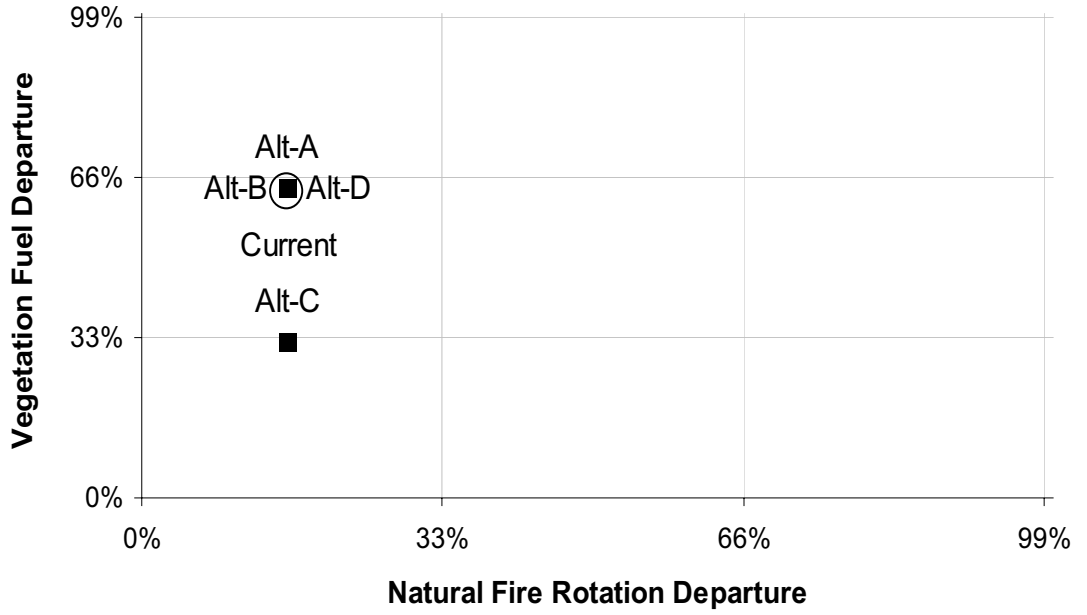

Figure 4-24. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Wet/Cold Conifer in the Shoshone Field Office (SFO).

Notes:

FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

Due to the lack of long-term fire history data for this cover type, the FRCC rating is based on vegetation/fuel departure. For clarity, departure from the historical fire rotation was positioned at the midpoint of FRCC 1.

4.2.4.7 Vegetated Rock/Lava

4.2.4.7.1 Short-term Effects

In the SFO area, alternative treatment levels for the Vegetated Rock/Lava cover type range from 0 acres (Alternatives B and D) to approximately 2,300 acres (Alternative C; see Table 4-23). These treatments consist of WFU and chemical treatments to control noxious weeds.

Wildland fire would be allowed on Vegetated Rock/Lava primarily in Alternative A and Alternative C (see Table 4-23). Since starts on this cover type are infrequent, it is assumed that only a small fraction of the existing acreage would burn. Furthermore, this vegetation is discontinuous and limited to areas with some soil development; therefore wildland fire would have minimal spread. Wildland fire would be allowed to burn, primarily due to suppression difficulties in this cover type, and the fact that much of the area is Wilderness Study Area. Since cheatgrass is not a substantial problem in this type, WFU would permit historical successional processes to occur. Noxious weed invasions,

usually found near the edges of Vegetated Rock/Lava, would be treated to prevent or reduce spread.

Short-term effects in this cover type would include the mortality of vegetation. This would most affect long-lived shrubs and trees, such as Wyoming big sagebrush, limber pine, and junipers. Since vegetation is patchy, fire effects would also be discontinuous, creating openings in areas with dense concentrations of fuels.

4.2.4.7.2 Long-term Effects

All alternatives would move the Vegetated Rock/Lava cover type towards DFC in the SFO (Table 4-29). All the alternatives would maintain composition of cheatgrass at or below 15 percent within this type.

TABLE 4-29. VEGETATION/AGE CLASS, DESIRED FUTURE CONDITION (DFC), CURRENT CONDITION, AND EFFECTS OF FOUR ALTERNATIVES FOR VEGETATED ROCK/LAVA, SHOSHONE FIELD OFFICE (SFO)

Vegetation/Age Class[1]	DFC	Current	Alternatives Over 30 Years			
			A[2]	B[3]	C	D
Perennial herbaceous	6%	3%	7%	7%	8%	7%
Tree/shrub/herbaceous	80	83	78	78	78	78
Cheatgrass	14	14	15	15	14	15

[1] Age Class is the number of years since last fire, which is used as an approximation of seral stage in this analysis.
[2] Alternative A is the No Action Alternative, which would continue present management direction.
[3] Alternative B is the Proposed Action Alternative.

Alternative A and Alternative C would treat Vegetated Rock/Lava, while Alternatives B and D would not treat this cover type. All alternatives, however, would maintain this cover type in FRCC 1 over 30 years. All alternatives would maintain current departures of fire rotation and vegetation and fuels structure and composition (Figure 4-25). Due to the small and fragmented nature of fire in this cover type, long-term changes in landscape composition and the resulting fuel and fire dynamics would be minimal.

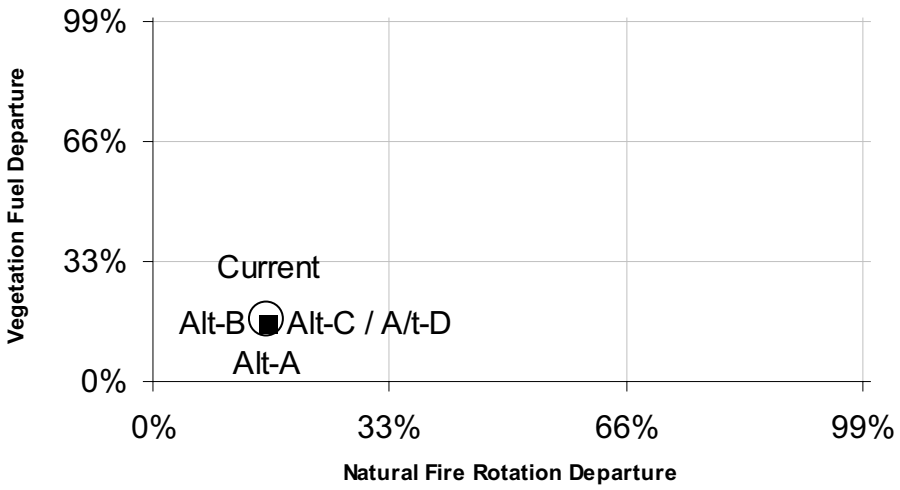

Figure 4-25. The effects of each alternative on Fire Regime Condition Class (FRCC) rating for Vegetated Rock/Lava in the Shoshone Field Office (SFO).

Notes:

FRCC 1 = 0-33%; FRCC 2 = 33-66%; FRCC 3 = 66-99%.

Due to the lack of long-term fire history data for this cover type, the FRCC rating is based on vegetation/fuel departure. For clarity, departure from the historical fire rotation was positioned at the midpoint of FRCC 1.

4.2.5 SPECIAL STATUS PLANT SPECIES

Special status plants occur in nearly all the vegetation types within the District. Rarity is usually associated with an affinity for unique habitat conditions (soil or vegetation cover characteristics), narrow endemism, and/or impacts that result in a decline in population size or number. These impacts include habitat alteration resulting from changes in the natural fire cycle, with either too little fire (as is the current situation in the higher elevation vegetation types) or too much (e.g. Low Elevation Shrub Steppe).

Since the effects of treatments to special status plants are, in part, dependent on the surrounding vegetation or the type of habitat or community that a plant occupies, this analysis of impacts is organized by vegetation types and will consider the types of treatments proposed for each alternative on a District level. Vegetation types are grouped as in Section 4.1. Impacts to special status plants may be similar to and are at least dependent in part on the effects of treatment on the plant community as a whole.

In all cases, BLM policy requires inventory and evaluation of project effects on special status plants (BLM Manual 6840). Treatments that might result in potential negative effects on special status plants would need to be evaluated in light of the status of the taxa, population health and integrity, ecology and response to disturbance, and habitat quality. In many cases, the ecology of special status plants is not well understood if studied at all. Therefore careful observation of trends within populations and relative to habitat conditions would be necessary to anticipate short- and long-term effects of vegetation treatments.

Special status plants in the Upper Snake River District, their status, field offices of occurrence, and the vegetation types where they occur are listed in Appendix F. Proposed treatment acreages by vegetation type are listed for each of the four alternatives in Tables 2.3–2.6.

4.2.5.1 Low-Elevation Shrub, Perennial Grassland, Annual Grass

4.2.5.1.1 Short-Term Effects

Special status plants occurring in the Low-elevation Shrub are impacted by large-scale habitat conversions, primarily to exotic annual grasslands and non-native seedings following fire. Conversion from Low-elevation Shrub Steppe to Annual Grass results in a change in vegetation structure as well as species composition. While some special status taxa might be tolerant of this conversion (e.g. *Astragalus atratus* var. *inseptus*, mourning milkvetch), habitat quality is marginal, and the status of plants, as well as other natives in the community, might be precarious due to competition and repeated fire. The effects of native and non-native seedings following fire are primarily due to the soil disturbance associated with the seeding process (usually drill-seeding or chaining). However, some competition, as well as change in community structure, can occur with establishment of non-native seedings. Seedings that replicate as closely as possible the structure, species composition, and seral dynamics of the native community would improve special status plant habitat over post-burn invasion of exotic annual grasses. The short-term effects of aerial seeding of sagebrush and other taxa would be negligible due to lack of soil disturbance.

In cases where an herbicide is needed to control invasive annual grasses or noxious weeds, treatment of areas supporting special status plants would need to be carefully planned or avoided in light of 1) effects of the herbicide (e.g. broad vs. narrow spectrum), 2) phenology of the plant (active growing phases vs. dormancy), 3) the level of impact relative to the distribution of the taxon or taxa as a whole, and 4) quality of habitat with and without treatment. For example, special status plants that are narrowly endemic with small, localized populations would be more impacted than taxa that are endemic but are relatively common within that range. Application of herbicide while a special status plant is actively growing, flowering, or setting fruit could result in mortality, lack of seed production, and negative impacts to the population. However, treatment during dormancy might not have effect the plant, but have positive effects on the habitat.

The effect of natural post-fire conversion to native grassland and/or RxFire and WFU treatments on a special status plant would depend on the ecology of the taxon and whether it is 1) fire tolerant, or 2) associated with a specific seral state of the native plant community. It could be assumed that sensitive plants occurring as an entity of a healthy native plant community would assume their natural role in succession, given a natural disturbance. This could mean that the plant might exist in undisturbed pockets of vegetation, or as part of the seed bank, until environmental conditions (e.g., light, competition) are appropriate. Some taxa (e.g. *Astragalus oniciformis,* Picabo milkvetch; Moseley & Popvich 1995) are poor competitors and need open light and vegetation conditions. Such taxa benefit somewhat from disturbances that recreate the openings of the early to mid-seral community. Special status plants tied to late seral communities would possibly be less tolerant of burning treatments due to shading or nutrient

requirements. However, it is unlikely that late seral communities containing special status plant habitat would be targeted for any treatment unless they were highly degraded and at risk for conversion to annual grassland or stand-replacement fire.

Alternative D proposes the greatest level of overall (footprint) treatment within the Low-elevation Shrub, Perennial Grass, and Annual Grass vegetation types, followed by Alternatives C, B, and A, respectively (Tables 2.3-2.6). Both Alternatives C and D include large 10-year treatment acreages (approximately 1.0 and 1.2 million acres, respectively) with the primary focus on chemical control of invasive and noxious weed and seeding of perennial vegetation and sagebrush, employing both mechanical and aerial methods. Alternatives A and B have similar emphasis but considerably less acreage (approximately 200,000 and 400,000 acres, respectively). RxFire would be used under all alternatives to prepared Annual Grass and Perennial Grass areas for subsequent chemical/seeding treatment and for creating mosaics in healthy but old, even-aged sagebrush stands. The amount of proposed RxFire is greatest in Alternative D (about 500,000 acres) and about half that in Alternatives B and C. Alternative A proposes very little use of RxFire (about 14,000 acres) Both of these alternatives include the use of wildland fire, with a nearly 10-fold increase in Alternative B (about 70,000 acres) vs. Alternative C (about 8,000 acres). Neither Alternative A nor D would allow WFU.

4.2.5.1.2 Long-Term Effects

Two important aspects of special status plant conservation are 1) protection of existing habitat, and 2) restoration of degraded habitat. The proposed treatments in each of the alternatives speak to both aspects, at different levels of intensity, with a primary objective of reducing wildland fire frequency and size in the Low-elevation shrub. Since project-level analysis provides for the protection of special status plants due to treatment, thereby protecting populations, long-term effects of the alternatives relate to their effectiveness in protection and restoration of habitat. Alternatives C and D propose to treat similar acreages of similar magnitudes, with Alternative D being slightly more aggressive (Tables 2.3-2.6). Alternatives C and D focus on restoration of nearly all Annual Grass acres within the District. Since Annual Grass provides little in the way of quality habitat for special status plants, long-term effects of habitat restoration would be positive. This would provide for connectivity between pockets of existing sagebrush steppe habitat and possibly allow expansion of special status species back into former habitats. Alternative B would treat approximately 38 percent of the total Annual Grass acreage and would provide only limited opportunity for expansion and connection of existing habitats, while Alternative A would treat only about 6 percent and would provide little to no opportunity.

Treatments in Low-elevation shrub and Perennial Grass focus on control of invasive and noxious weeds and diversification of the plant community both locally and on a landscape level though use of fire, mechanical treatments, and seeding. Special status plants adapted to early or mid-successional stages of the Low-elevation shrub vegetation type might decrease over time due to increases in shrub densities or competition resulting from successful seeding treatments, although long-term goals for treatments aim towards creating a diverse mosaic of seral stages across the landscape. As discussed throughout Section 4.2, Alternatives A and B would do little to reduce uncharacteristic vegetation in these types and move the vegetation towards a desired composition and more natural, longer fire cycle. Alternatives C and D would have similar effects, with Alternative D

being slightly more effective. Improved habitat quality, structural and species diversity, and reduced fire size and occurrence would, in the long-term, contribute to greater potential for special status plant protection and conservation.

4.2.5.2 Mid-Elevation Shrub, Juniper, and Juniper-Encroachment

4.2.5.2.1 Short-Term Effects

Communities in the Mid-elevation shrub vegetation type have be altered by lengthened fire cycles (due to long-term suppression), resulting in less patterning of seral stages across the landscape and juniper encroachment. This has resulted in a need to reintroduce fire or other types of disturbance to this type, while controlling potential invasive or noxious weeds.

True juniper and pinyon-juniper, mountain mahogany, low sagebrush, and black sagebrush communities tend to occur on relatively fire-resistant and/or rocky sites. Special status plants occurring on these types of sites would not be impacted due to a lack of need to treat this type of site. Treatments in Mid-elevation Shrub would be focused on areas where natural processes, and thus habitat quality, have been altered by lack of fire disturbance. Juniper encroachment results in a decrease in herbaceous plant cover in the understory, which could have a negative effect on special status plants that are part of the Mid-elevation Shrub vegetation type. As discussed in the previous section on Low-elevation Shrub, treatment effects would depend on the seral status of a special status plant within a specific community and its tolerance of fire as well as competitive ability and shade tolerance. Species such as *Phacelia inconspicua* (obscure phacelia) occur in openings in this vegetation type (as well as aspen and mountain shrub), indicating a need for disturbance (Murphy 2002). Treatments involving soil surface disturbance and/or chemical application would need to be evaluated relative to special status plant populations (see the discussion for low elevation shrub steppe above). Mechanical treatments that result in deposition of large amounts of woody litter would need to be avoided in areas supporting special status plant populations.

Alternative C would treat approximately half the acreage of Mid-elevation Shrub and juniper encroachment areas in the District over a 10 year period. Alternatives A, B, and D would treat approximately 3 percent, 15 percent, and 28 percent of the area, respectively (Tables 2.3–2.6). Each alternative would employ RxFire to reintroduce disturbance into the system with Alternative C placing the greatest emphasis on RxFire and WFU. Alternative D places a greater emphasis than the other alternatives on mechanical and chemical means to control unwanted vegetation and less emphasis than Alternative D on RxFire and WFU. Seeding treatments would be used in areas needing reestablishment of herbaceous or shrubby vegetation. Aerial seeding for the reestablishment of sagebrush in all alternatives would have essentially no short-term impact.

4.2.5.2.2 Long-Term Effects

Treatment of this vegetation type would focus on restoring structural and species diversity, as well as reintroducing fire to maintain historical processes and patterns. Special status plants are protected by site-specific project evaluation; projects could positively affect taxa by maintaining a seral community and/or expanding potential habitat on a landscape scale. Alternative C is the only alternative that proposes adequate

acreage to move the current vegetation towards a desired seral composition, reduce undesirable vegetation, and return the fire cycle to more natural (historical) conditions within a 30-year period. Alternatives A and B would treat less acreage and therefore would have fewer direct, short-term impacts, but would possibly in the long-term have a greater negative effect on special status plants due to lack of treatment and continued degradation of habitat. Alternative D would be less effective than Alternative C, but still would provide for relatively aggressive treatment.

4.2.5.3 Salt Desert Shrub

4.2.5.3.1 Long-Term Effects

Fire in the Salt Desert Shrub vegetation type is a rare occurrence in the District. Treatments are proposed for Alternative A only, as most of this vegetation type is currently in FRCC 1 (see Table 2-3). Treatments proposed under Alternative A are chemical and seeding treatments that would occur in response to wildland fire and are proposed on less than 3 percent of the total acreage of salt desert shrub over a 10-year period (Tables 2.3). Due to the relatively small proportion of acreage proposed for treatment, it is highly unlikely that these treatments would impact any special status plant populations. No treatments are proposed under Alternatives B, C, or D.

4.2.5.4 Aspen/Dry Conifer

4.2.5.4.1 Short-Term Effects

Communities in the Aspen/Dry Conifer vegetation type have be altered by lengthened fire cycles (due to long-term suppression), resulting in less patterning of seral stages across the. This has resulted in a need to reintroduce fire or other types of disturbance to this type, while controlling potential invasive or noxious weeds. Treatments in this vegetation type would be focused on areas where natural processes and patterns have been altered by lack of fire disturbance. As discussed in the previous section on Low-elevation Shrub, treatment effects would depend on the seral status of a special status plant within a specific community and its tolerance of fire as well as competitive ability and shade tolerance. Species such as *Phacelia inconspicua* (obscure phacelia) occur in openings in the aspen vegetation type (as well as Mid-elevation Shrub and Mountain Shrub), indicating a need for low-levels of disturbance to maintain those openings (Murphy 2002). Unnatural buildup of fuels in this type would lead to higher intensity fires that could damage, rather than invigorate, the community and potentially special status plant populations. Treatments involving soil surface disturbance and/or chemical application would need to be evaluated relative to special status plant populations (see the discussion for Low-elevation Shrub).

Alternative B would treat about 21 percent of the aspen/dry conifer type in the District over a 10-year period. Alternatives A, C, and D would treat approximately 3 percent, 14 percent, and 0 percent of the area, respectively (Tables 2.3–2.6). Treatments would focus primarily on mechanical, RxFire and WFU treatments to thin woody vegetation and stimulate aspen reproduction and understory diversity.

4.2.5.4.2 Long-Term Effects

Treatment of this vegetation type would focus on restoring structural and species diversity, as well as reintroducing fire to maintain historical processes. Special status plants are protected by site-specific project evaluation; projects could positively affect taxa by maintaining a seral community and/or expanding potential habitat on a landscape scale. Alternatives B and C propose adequate acreage to move the current vegetation towards a desired seral composition and reduce undesirable vegetation; however, Alternative B would return the fire cycle to more natural (historical) conditions within a 30-year period. Alternatives A and D would do nothing to ecological problems in this vegetation type. While these alternatives would treat little to no acreage and therefore would have no direct, short-term impacts, but would possibly in the long-term have a greater negative effect on special status plants due to lack of treatment and continued degradation of habitat.

4.2.5.5 Mountain Shrub

4.2.5.5.1 Short-Term Effects

Communities in the Mountain Shrub vegetation type have be altered by lengthened fire cycles (due to long-term suppression), resulting in less patterning of seral stages across the landscape and juniper encroachment. This has resulted in a need to reintroduce fire or other types of disturbance to this type, while controlling potential invasive or noxious weeds.

Several of the special status plants in this vegetation type, including *Cryptantha caespitosa* (tufted cryptantha), *Eriogonum capistratum* var. *welshii* (Welsh's buckwheat), and *Astragalus gilviflorus* (tufted milkvetch) tend to occur on relatively fire-resistant, sparsely vegetated and rocky sites. Plants occurring on these types of sites would not be impacted due to lack of need for treatment. Treatments in the Mountain Shrub vegetation type would be focused on areas where natural processes and patterns have been altered by lack of fire disturbance. Closure of the shrub canopy can decrease herbaceous plant cover in the understory, which could have a negative effect on special status plants that are part of Mountain Shrub vegetation cover type. As discussed in the previous section on Low-elevation Shrub, treatment effects would depend on the seral status of a special status plant within a specific community and its tolerance of fire as well as competitive ability and shade tolerance. Species such as *Phacelia inconspicua* (obscure phacelia) occur in openings in this vegetation type (as well as in the Aspen and Mountain Shrub vegetation types), indicating a need for disturbance (Murphy 2002). Treatments involving soil surface disturbance and/or chemical application would need to be evaluated relative to special status plant populations (see the discussion for Low-elevation Shrub above).

Alternative C would treat approximately 42 percent the acreage of Mountain Shrub vegetation type in the District over a 10-year period. Alternatives A, B, and D would treat <1 percent, 9 percent, and 13 percent of the area, respectively (Tables 2.3–2.6).

4.2.5.5.2 Long-Term Effects

Treatment of this vegetation type would focus on restoring structural and species diversity, as well as reintroducing fire to maintain historical processes. Special status

plants are protected by site-specific project evaluation; projects could positively affect taxa by maintaining a seral community and/or expanding potential habitat on a landscape scale. While Alternatives B, C, and D all make progress towards DFC, Alternative C is the only alternative that proposes adequate acreage to move the current vegetation towards a desired seral composition, reduce undesirable vegetation, and return the fire cycle to more natural (historical) conditions within a 30-year period (see discussion Section 4.1). Alternatives B, C, and D would treat less acreage and therefore would have fewer direct, short-term impacts, but would possibly in the long-term have a greater negative effect on special status plants due to lack of treatment and continued degradation of habitat.

4.2.5.6 Wet/Cold Conifer

4.2.5.6.1 Short- and Long-Term Effects

There are currently no special status species associated with the Wet/Cold Conifer vegetation type.

4.2.5.7 Riparian

4.2.5.7.1 Short- and Long-Term Effects

Riparian areas in the District tend to occur primarily as small inclusions within other vegetation types, with the exception of the broader riparian zones adjacent to large water bodies such as the Main and South Fork Snake River. Therefore, fire frequency and the effects of fire on the riparian vegetation is largely dependent on the type of adjacent vegetation. Special status plants associated with the Riparian vegetation type include *Primula alcalina* (alkali primrose), *Lomatogonium rotatum* (Marsh felwort), *Salix candida* (hoary willow), and the District's only listed plant, *Spiranthes diluvialis* (Ute's-ladies tresses). These species occur in areas where the soil is saturated for much, if not all, of the growing season and vegetation remains green until late in the year. These areas are usually broad with little to no gradient.

Riparian areas in the District would be treated would be treated incidentally under Alternatives A and C as part of the treatment of adjacent vegetation types. RxFire and seeding treatments proposed under Alternative A would comprise only about 1 percent of the total riparian acreage over a 10-year period. WFU, RxFire, mechanical, chemical, and seeding treatments proposed under Alternative C would comprise approximately 2 percent of the total riparian acreage over a 10-year period. No treatments are proposed under Alternatives B and D.

It is unlikely, due to the minute acreage proposed in Alternatives A and C, that treatments would have any short-term negative effect on special status plants. It is not anticipated that areas supporting special status plants would treated, unless site-specific information indicates that small-scale RxFire use would be used to maintain a seral community and be beneficial to the taxa.

4.2.5.8 Vegetated Rock/Lava/Other

4.2.5.8.1 Short- and Long-Term Effects

There are no current special status plants that occur on Vegetated Lava. Taxa occurring in "Other" habitats include *Oenothera psammophila* (St. Anthony evening primrose), which occurs on sparsely vegetated sand dunes, and *Piptatherum micranthum* (small-flowered ricegrass), which occurs in cracks and on ledges of limestone cliffs. Such habitats would not receive treatments under any alternative and therefore would not be subject to treatment effects.

4.2.6 MITIGATION AND MONITORING

The management restrictions listed in Chapter 2, Description of Alternatives, are incorporated into management practices common to all alternatives. These practices would be implemented to avoid adverse impacts to vegetation. Because of this, no further mitigation would be required to protect the vegetation resource.

Prior to any vegetation treatment, site-specific NEPA analysis would occur. The impacts analysis would include consideration for special status plant species and habitats, including mitigation to prevent significant adverse impacts to these species.

4.2.7 UNAVOIDABLE ADVERSE IMPACTS

Short-term unavoidable adverse impacts to vegetation would include the same short-term vegetation treatment disturbances described above. Long-term unavoidable adverse impacts would persist in cover types remaining in FRCC 3 under all alternatives. In these FRCCs, vegetation of the District would continue to experience unnatural fire regimes and associated negative effects. Vegetation-related processes and special status species would be adversely impacted, and noxious weed problems would continue. The lack of vegetation management would increase the risk of losing key ecosystem components, producing unavoidable adverse impacts.

4.2.8 IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES

Irretrievable impacts to vegetation would include the short-term vegetation treatment disturbances described above. There would be no irreversible impacts as these vegetation resources could be restored through the effective implementation of a rehabilitation and restoration program as described in Chapter 2.

4.2.9 CUMULATIVE EFFECTS

The spatial scale for cumulative impacts includes the District and immediately adjacent areas. For this analysis, past, present, and reasonably foreseeable future actions include fire management activities only.

In general, the action alternatives would positively contribute to the goals of other past, present, and reasonably foreseeable future plans in or adjacent to the District. The action alternatives would be consistent with the Interior Columbia Basin Ecosystem Management Project, designed to improve the health of the sagebrush steppe ecosystem, and the BLM's MOU of 2003, which aims to successfully implement this project.

The action alternatives, especially Alternative D, would contribute positively to meeting the vegetative goals of the INEEL management plans by emphasizing protection of sagebrush steppe habitat, including Low-elevation Shrub. Management plans for these areas would also need to concur with national-level fire management policy and direction, and as such, would be consistent with the objectives of this EIS. Negative cumulative impacts would not be anticipated.

A cumulatively positive effect would also occur when considering the action alternatives in conjunction with the Caribou-Targhee National Forest fire management plan. Objectives to restore natural fire regimes and the associated vegetation composition and structure would positively extend to these adjacent federal lands. The action alternatives are also consistent with the Idaho Statewide Implementation Strategy for the National Fire Plan and would not result in cumulative adverse impacts to the vegetation resource. However, it should be noted that the scale of these fire management activities is very small in comparison with the action alternatives.

It is not likely that the action alternatives when considered in conjunction with past, present, or reasonably foreseeable future actions would cause short- or long-term cumulative significant adverse impacts to the vegetation resource of the District. While short-term impacts to vegetation composition, structure, and productivity would occur with the above-mentioned projects, the difference in scale when comparing other plans to the District plan precludes the possibility for adverse cumulative impacts. Also, the long-term impacts of improving fire regimes across the District would positively affect other land management issues of the District and the immediately adjacent area.

4.3 ANALYSIS OF EFFECTS ON WILDLAND URBAN INTERFACE (WUI)

This section details the effects of treatment levels on Wildland Urban Interface areas and communities-at-risk across alternatives.

4.3.1 ANALYSIS ASSUMPTIONS AND METHODS

This section examines the impacts of each alternative in order to assess how to best meet select objectives of the National Fire Plan and Cohesive Strategy within the District. This primarily involves reducing the potential for wildland fire in and around Wildland Urban Interface using tools such as creating anchored fuel breaks, reducing tree densities in juniper woodlands and conifer forests, and replacing continuous patches of annual grasses/exotic weeds with perennial grasses and shrubs in Low- and Mid-elevation Shrub, so that Wildland Urban Interface areas have acceptable fuel loads and are defensible from wildland fires.

Management actions associated with this objective include:

- Use Appropriate Management Response to safely manage and suppress fires.
- Use mechanical, chemical, and seeding treatments as well as small-scale fire operations (e.g., pile burning) to change vegetation and/or reduce fuel loading and facilitate the use of RxFire treatments where applicable in the future.

- Develop mitigation plans and implement plan actions including fuels reduction work, rural fire department assistance, and public education in cooperation with state, county, and local governments and fire departments.

Tables 4-30 through 4-33 compare alternatives by field office, though the discussion below summarizes projected outcomes based on the alternatives. Communities presented in the first column of each table are grouped together based on proximity to each other (referred to as Wildland Urban Interface Areas of Concern), and were analyzed together as a group. Appendix I lists communities in the vicinity of public lands at risk from wildland fire in Idaho as published in the Federal Register (Volume 66, August 17, 2001). Appendix J lists communities considered by BLM personnel to be at the highest risk from unwanted wildland fire.

The columns in the tables labeled 'Proposed Treatment-acres' used the 10-year treatment footprint-acres as the basis to compare among alternatives, which could include any combination of any mechanical, chemical, seeding, and RxFire treatments depending on management objectives for a given area.

The columns in the tables labeled 'Relative Potential Risk to Public and Fire-fighter Health and Safety establish a risk factor/category that one would expect to see after 10 years or longer, as a product of specific management goals for a given alternative. Impacts were analyzed based on the projected number of unwanted high intensity wildland fire acres. Ideally, impacts to public and firefighter health and safety would be analyzed using intensity level of unwanted wildland fire in conjunction with number of acres burned. Unfortunately historical fire intensity data does not exist. . Because number of acres burned historically was used for this analysis without additional information on fire intensity levels, some of the risk ratings for WUI Areas of Concern are too low and do not adequately represent the real risk associated with high intensity wildland fire (e.g. American Falls, Chubbuck, Fort Hall, Inkom, Pocatello, Arimo, Downey, Lava Hot Springs, McCammon, Virginia).

Using projected number of wildland fire acres and proposed treatment acres, inference was made as to what the relative potential risk to public and fire-fighter health and safety would be from wildland fire based on best professional judgment and past experience. An assumption was made that an acre of treatment occurring within or around a WUI area would reduce fire intensity to an acceptable risk level on that acre for a minimum of ten years. Note that risk categories do not take into account topographical considerations, population density, fuel types, and other similar considerations that could influence fire behavior in and around Wildland Urban Interface areas. A more comprehensive statewide assessment of relative risk to communities and ecosystems in Idaho was completed in 2003 by an interagency group that included the BLM, Forest Service, and Idaho Department of Lands. The data generated by this group will be used by the Idaho State Fire Plan Working Group to assist with the prioritization of National Fire Plan related projects across ownerships and jurisdictions, at a subwatershed or county level, throughout the state. More information on this project can be found at http://www.fs.fed.us/r4/id_fire_assessment/id_haz_risk.html.

For the purposes of this analysis, risk categories include:

- Low Risk: projected high intensity fire acres of less than or equal to 1,000 acres
- Moderate Risk: projected high intensity fire acres between 1,001 and 30,000 acres
- High Risk: projected high intensity fire acres of greater than 30,000 acres

Assumptions for these analyses include: all proposed Wildland Urban Interface treatments occur on BLM-administered land near communities-at-risk so that treatments have a direct and immediate impact to communities-at-risk, and counties and communities-at-risk continue to create defensible space as well as wildland fire compatible fire-wise homes and communities so that damage from public land fires, and risks from wildland fires escaping from private land to BLM-administered lands are diminished.

4.3.2 DIRECT AND INDIRECT IMPACTS

In general, the consequences of implementing the National Fire Plan and Cohesive Strategy would benefit Wildland Urban Interface areas since one of the main objectives of this plan is to reduce fire risks within Wildland Urban Interface areas. To accomplish this, the BLM must reduce woody and/or herbaceous fuel loads and maintain low-risk fire conditions within the cover types that are within and adjacent to Wildland Urban Interface areas. Site-specific management plans would propose the use of various chemical, mechanical and seeding techniques, and to a lesser degree, RxFire to reduce fuel loads and maintain low-risk condition within Wildland Urban Interface areas. In general, the more treatments a WUI area receives, the lower the long-term risk of that community experiencing a catastrophic fire. When RxFire is used, there would be some increased risk to public and fire-fighter health and safety, which is inherent to the use of any kind of fire treatment. These risks are short term and much lower than the risks associated with unwanted wildland fire. Mitigation measures and contingency plans would be in place to minimize the risk of an escaped RxFire.

Some Wildland Urban Interface Areas of Concern have low relative potential risk projected for them under Alternative A (see Tables 4-30 through 4-33), due to a low level of wildland fire historically. In those WUI Areas of Concern where there have been high levels of wildland fire historically, without treatment, fuel loads and associated fire behavior would not diminish. Full-scale suppression would continue to be the primary tool in reacting to wildland fires; wildland fire damage to property would continue; financial and labor costs would increase; and the risk to public and fire-fighter health and safety would be ever increasing as more public land managers and property owners are faced with wildland fires.

Alternatives B, C, and D have low to high relative potential risks to WUI Areas of Concern depending on historical levels of wildland fire and amount of treatment proposed. Where treatment involves the use of RxFire, there would be a small increase in risk to public and fighter health and safety due to the unlikely possibility of an escaped fire. The small increase in risk due to the use of RxFire is overshadowed, however, by the benefits associated with treatment (i.e. substantially reduced risk to public and firefighter health and safety over the long run) Treatments over time would reduce the incidence of catastrophic wildland fire by reducing woody and/or herbaceous fuel loading, reducing

fire intensity levels, increasing defensible space, and restoring native vegetation where feasible.

Of the four alternatives, the least amount of acreage treated would be under Alternative A, with several Wildland Urban Interface Areas of Concern receiving no treatments. Overall, the number of acres treated under Alternative A would be a minimum of 2.6 times less than that proposed under the other alternatives. Thus, potential consequences under Alternative A include worsening fuel conditions (e.g., increased fuel loads) for those communities that border areas with little or no vegetation treatments. It is expected that larger and/or hotter more intense fires would be seen in these areas, increasing risk to public and fire-fighter health and safety dramatically.

Alternatives C and D propose the highest amount of treatment acres and therefore would make the most progress towards creating fire safe communities. Alternative D, however, focuses only on Low- and Mid-elevation Shrub, Mountain Shrub, Perennial Grass, and Annual Grass vegetation cover types. For those Wildland Urban Interface Areas of Concern that border forested BLM land, there would be no improvement and a likely worsening of existing conditions. Long-term impacts may be similar to Alternative A for those communities bordering forested BLM land. Alternative B proposed a moderate amount of treatment-acreage (in between Alternative A and Alternatives C/D). Those WUI Areas of Concern that are of highest priority (see Appendix K) would have a reduced risk to public and firefighter health and safety over the long term.

TABLE 4-30. IDAHO FALLS FIELD OFFICE (IFFO) WILDLAND URBAN INTERFACE (WUI) ALTERNATIVES

	Alternative A		Alternative B		Alternative C		Alternative D	
WUI Areas Of Concern	Proposed Treatment-acres[1] (10-Yr Footprint-acres)	Relative Potential Risk to Public and Fire-fighter Health and Safety[2]	Proposed Treatment-acres[1] (10-Yr Footprint-acres)	Relative Potential Risk to Public and Fire-fighter Health and Safety[2]	Proposed Treatment-acres[1] (10-Yr Footprint-acres)	Relative Potential Risk to Public and Fire-fighter Health and Safety[2]	Proposed Treatment-acres[1] (10-Yr Footprint-acres)	Relative Potential Risk to Public and Fire-fighter Health and Safety[2]
Butte City, Howe	0	Moderate	6,000	Low	15,650	Low	42,000	Low
Chester, Dubois, Garfield, Hamer, Lewisville, Parker, Rigby, Roberts, St. Anthony, Ucon	10,720	Moderate	60,000	Moderate	83,669	Moderate	47,200	Moderate
Aberdeen, Atomic City, Pingree, Rockford, Springfield, Sterling	1,850	High	70,000	Moderate	108,840	Moderate	270,800	Low

TABLE 4-30. IDAHO FALLS FIELD OFFICE (IFFO) WILDLAND URBAN INTERFACE (WUI) ALTERNATIVES

	Alternative A		Alternative B		Alternative C		Alternative D	
Arco, Darlington, Lost River, Moore	0	Moderate	5,000	Low	29,680	Low	32,000	Low
Blackfoot, Firth, Moreland, Riverside, Shelley	0	Low	1,000	Low	60	Low	290	Low
Monteview, Mud Lake, Terreton	0	Moderate	10,000	Low	17,515	Low	48,000	Low
Ashton, Island Park, Kilgore, Macks Inn, Marysville, Spencer, Warm River	4,770	Low	7,000	Low	14,960	Low	3,500	Low
Heise, Irwin, Lorenzo, Ririe, Swan Valley, Thornton	0	Low	2,000	Low	830	Low	3,000	Low
Bone, Idaho Falls, Iona, Lincoln	0	Low	1,000	Low	1,100	Low	9,000	Low
Driggs, Drummond, Felt, Newdale, Rexburg, Sugar City, Teton, Tetonia, Victor	0	Low	2,200	Low	550	Low	1,150	Low
TOTAL	**17,340**		**164,200**		**272,854**		**456,940**	

[1] Includes chemical, mechanical, seeding, and RxFire treatments.

[2] Includes the risks associated with unwanted wildland fire over 10 years.

TABLE 4-31. POCATELLO FIELD OFFICE (PFO) WILDLAND URBAN INTERFACE (WUI) ALTERNATIVES

	Alternative A		Alternative B		Alternative C		Alternative D	
WUI Areas Of Concern	Proposed Treatment-acres[1] (10-Yr Footprint-acres)	Relative Potential Risk to Public and Fire-fighter Health and Safety[2]	Proposed Treatment-acres[1] (10-Yr Footprint-acres)	Relative Potential Risk to Public and Fire-fighter Health and Safety[2]	Proposed Treatment-acres[1] (10-Yr Footprint-acres)	Relative Potential Risk to Public and Fire-fighter Health and Safety[2]	Proposed Treatment-acres[1] (10-Yr Footprint-acres)	Relative Potential Risk to Public and Fire-fighter Health and Safety[2]
Basalt, Wayan	750	Low	500	Low	11,425	Low	13,850	Low
American Falls, Chubbuck, Fort Hall, Inkom, Pocatello,	250	Moderate	8,500	Low	13,169	Low	7,000	Low
Bennington, Bern, Bloomington, Dingle, Fish Haven, Georgetown, Montpelier, Ovid, Paris, St. Charles	0	Low	600	Low	2,166	Low	300	Low
Geneva	0	Low	0	Low	19,600	Low	17,750	Low
Bancroft, Conda, Soda Springs	200	Low	3,900	Low	5,400	Low	4,200	Low
Arimo, Downey, Lava Hot Springs, McCammon, Virginia	175	Low	2,350	Low	6,054	Low	2,150	Low
Banida, Grace, Mink Creek, Oxford, Samaria, Swanlake, Thatcher	100	Low	3,000	Low	6,025	Low	2,500	Low
Clifton, Dayton, Franklin, Malad City, Preston, Weston	0	Low	300	Low	1,000	Low	300	Low

TABLE 4-31. POCATELLO FIELD OFFICE (PFO) WILDLAND URBAN INTERFACE (WUI) ALTERNATIVES

	Alternative A		Alternative B		Alternative C		Alternative D	
Arbon, Pauline	500	Moderate	9,800	Low	48,371	Low	9,000	Low
Holbrook, Stone	0	Low	6,000	Low	68,010	Low	42,000	Low
Rockland	0	Moderate	600	Low	2,000	Low	600	Low
TOTAL	**1,975**		**35,550**		**183,220**		**99,650**	

[1] Includes chemical, mechanical, seeding, and RxFire treatments.

[2] Includes the risks associated with unwanted wildland fire over 10 years.

TABLE 4-32. BURLEY FIELD OFFICE (BFO) WILDLAND URBAN INTERFACE (WUI) ALTERNATIVES

	Alternative A		Alternative B		Alternative C		Alternative D	
WUI Area Of Concern	Proposed Treatment-acres[1] (10-Yr Footprint-acres)	Relative Potential Risk to Public and Fire-fighter Health and Safety[2]	Proposed Treatment-acres[1] (10-Yr Footprint-acres)	Relative Potential Risk to Public and Fire-fighter Health and Safety[2]	Proposed Treatment-acres[1] (10-Yr Footprint-acres)	Relative Potential Risk to Public and Fire-fighter Health and Safety[2]	Proposed Treatment-acres[1] (10-Yr Footprint-acres)	Relative Potential Risk to Public and Fire-fighter Health and Safety[2]
Buhl, Castleford, Hollister, Rogerson	3,200	Moderate	4,500	Moderate	15,763	Low	16,350	Low
Acequia, Albion, Burley, Declo, Filer, Hansen, Heyburn, Kimberly, Minidoka, Murtaugh, Norland, Oakley, Paul, Rock, Creek, Rupert, Twin Falls	250	Moderate	1,850	Low	9,450	Low	6,550	Low
Conner, Elba, Malta	4,875	Moderate	12,550	Moderate	24,583	Low	8,500	Moderate
Almo	825	Moderate	3,000	Low	7,900	Low	3,200	Low
TOTAL	**9,150**		**21,900**		**57,696**		**34,600**	

[1] Includes chemical, mechanical, seeding, and RxFire treatments.

[2] Includes the risks associated with unwanted wildland fire over 10 years.

TABLE 4-33. SHOSHONE FIELD OFFICE (SFO) WILDLAND URBAN INTERFACE (WUI) ALTERNATIVES

	Alternative A		Alternative B		Alternative C		Alternative D	
WUI Area Of Concern	Proposed Treatment-acres[1] (10-Yr Footprint-acres)	Relative Potential Risk to Public and Fire-fighter Health and Safety[2]	Proposed Treatment-acres[1] (10-Yr Footprint-acres)	Relative Potential Risk to Public and Fire-fighter Health and Safety[2]	Proposed Treatment-acres[1] (10-Yr Footprint-acres)	Relative Potential Risk to Public and Fire-fighter Health and Safety[2]	Proposed Treatment-acres[1] (10-Yr Footprint-acres)	Relative Potential Risk to Public and Fire-fighter Health and Safety[2]
Fairfield	8,725	Moderate	4,000	Moderate	27,100	Moderate	23,500	Moderate
Bellevue, Hailey, Ketchum, Sun Valley	400	Low	3,000	Low	18,200	Low	5,950	Low
Gannett, Picabo	0	Low	8,000	Low	38,117	Low	7,400	Low
Dietrich	6,125	High	86,000	Moderate	166,526	Moderate	188,000	Moderate
Richfield, Shoshone	780	High	27,000	Low	57,870	Low	48,730	Low
Carey	37,995	High	6,000	High	68,608	Moderate	31,000	High
Eden, Hagerman, Hazelton, Jerome, Wendell	0	Moderate	20,000	Low	30,822	Low	33,000	Low
Corral, Hill City	0	Moderate	5,000	Low	85,493	Low	10,800	Low
Bliss, Gooding, King Hill	0	Moderate	34,000	Low	56,326	Low	47,000	Low
TOTAL	**54,025**		**193,000**		**549,062**		**395,380**	

[1] Includes chemical, mechanical, seeding, and RxFire treatments.

[2] Includes the risks associated with unwanted wildland fire over 10 years.

4.3.3 MITIGATION AND MONITORING

The management restrictions listed in Chapter 2, Description of Alternatives, are incorporated into management practices common to all alternatives. These practices would be implemented to avoid adverse impacts to WUI. Because of this, no further mitigation would be required to protect the WUI.

4.3.4 UNAVOIDABLE ADVERSE IMPACTS

None of the action alternatives would have unavoidable adverse impacts on WUI in the District.

4.3.5 IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES

None of the action alternatives would result in irretrievable or irreversible impacts on WUI.

4.3.6 CUMULATIVE EFFECTS

The most beneficial impact to wildland urban interface is the completion and implementation of the community-at-risk assessment that is underway by the counties and BLM. Also, the fire planning work undertaken in similar plans include the Interior Columbia Basin Ecosystem Management Project, as well as the Sawtooth, Caribou, and Targhee National Forests management plans, and the Idaho Statewide Implementation Strategy for the National Fire Plan would help reduce the intensity and duration of fires in the region.

Additionally, the Idaho Department of Lands (IDL), in conjunction with the BLM and other federal agencies, signed the Idaho Statewide Implementation Strategy for the National Fire Plan. The implementation plan focuses on fire preventions and suppression, hazardous fuels reduction, restoration of fire-adapted ecosystems, and the promotion of community assistance in fire management (IDL 2002). During 2002, Idaho Department of Lands, in cooperation with federal agencies, disbursed 1.9 million dollars to wildland-urban interface projects and development of defensible space. Additional money was used for hazardous fuels reduction programs for several communities, including Island Park, Idaho (IDL 2002b). The develop of risk assessments and mitigation plans would allow counties and communities within the District to determine their current fire hazard risk and to develop effective mitigation to minimize urban-wildland risks to persons and property. Additionally, implementation of community-based fuels reduction programs provides opportunities for private landowners to work with public land management agencies to manage the urban-wildland interface. The projects that result from the Idaho Statewide Implementation Strategy would likely contribute cumulatively to the decrease in fire risks to people and property at the urban-wildland interface. Also, the community-based fuel reduction programs would help decrease the risk of large, intense fires, with associated lessened cumulative impacts to air quality, water quality, wildlife habitat, and soils.

4.4 ANALYSIS OF EFFECTS ON THE SAGEBRUSH STEPPE ECOSYSTEM (ISSUE 2)

This section details the effects of treatment levels on habitats for the Sagebrush Guild species across alternatives. In doing so, this section addresses Issue 2 as described in Section 1.4.1, Issues Driving Development of Alternatives.

4.4.1 GENERAL ANALYSIS OF EFFECTS BY VEGETATION COVER TYPE

Short-term impacts to Sagebrush Guild habitats depend on which cover types are considered, as well as the kinds of treatments applied. Treatments of cheatgrass-dominated Annual Grass result in different effects than treatments in Perennial Grass, Low- and Mid-elevation Shrub, and areas of juniper encroachment within Juniper. For purposes of analyzing the impacts on the Sagebrush Guild, Annual Grass (e.g.,

cheatgrass) is generally considered to be low-quality habitat. The treatment of Annual Grass results in few negative impacts on the Sagebrush Guild because this habitat provides little value to these species, and this trade-off benefits the habitat for the guild in the long-term. Treatments in Perennial Grass would rapidly recover and result in relatively light impact to the Sagebrush Guild. Treatments in Low- and Mid-elevation Shrub and areas of juniper encroachment within Juniper would result in decreased habitat quality over the short-term due to reduced canopy cover and structural diversity. This would be a negative impact to Sagebrush Guild species. However, these treatments would occur in small areas within larger areas of sagebrush cover; and the impact to the Sagebrush Guild would be expected to be minimal. Generally, the Mid-elevation Shrub cover types would receive lesser levels of treatment. Treatment of Juniper would improve and enhance habitat values for the Sagebrush Guild by replacing juniper with sagebrush steppe habitat.

4.4.2 Analysis of Effects for the Idaho Falls Field Office (IFFO)

4.4.2.1 Low-elevation Shrub, Perennial Grass, and Annual Grass

4.4.2.1.1 Short-term Effects

Alternative treatment levels in these cover types range between approximately 4,250 acres (Alternative A) and 474,000 acres (Alternative D) of sagebrush steppe, which is generally considered potential Sagebrush Guild habitat (Table 4-34).

Most of the Low-elevation Shrub, Perennial and Annual Grass cover types in the IFFO have been affected by increased fire frequencies. Among the four alternatives (see Table 4-34), Alternative A would have the least effect on these cover types. Alternative A would not restore cheatgrass and/or perennial-dominated areas to sagebrush, nor would it reconnect areas of relatively intact sagebrush canopy (Low-elevation Shrub). Alternative D would improve and enhance more sagebrush steppe than the other alternatives. Alternatives B and C would improve intermediate levels of unsatisfactory sagebrush habitat.

Table 4-34. Sagebrush Steppe Cover Types and Their Acreages in the Idaho Falls Field Office (IFFO)

Cover type	Total Acres in IFFO	Alternatives (footprint-acres)[1]			
		A[2]	B[3]	C	D
Low-elevation Shrub	913,183	2,500	101,500	55,200	216,790
Perennial Grass	470,003	1,750	52,600	172,000	257,000
Annual Grass	36	0	0	36	0
Mid-elevation Shrub	231,518	16,500	56,990	161,700	78,220
Juniper	5,380	0	2,200	3,300	900
Source Habitat[4]	776,333	0%	6.9%	7.7%	9.9%

[1] Footprint-acres describe broad treatment levels over 10 years for rehabilitation and restoration.

[2] Alternative A is the No Action Alternative, which would continue present management direction.

[3] Alternative B is the Proposed Action Alternative.

[4] Total acres of sage grouse Source Habitat and percentage of the area disturbed.

Other Notes: Fire and non-fire treatments over 10 years are also presented. Apparent precision of the acreages is a product of spreadsheet analysis.

Invasion of the sagebrush steppe by Annual Grass has been relatively minor in the Sands region (20 percent invasion) compared to Big Butte and Big Desert areas (more than 80 percent invasion). Perennial Grass habitat in Idaho Falls is predominately native grassland and provides essential habitat for Grassland Guild species. Alternative D would treat approximately 257,000 acres of Perennial Grass (see Table 4-34) by seeding sagebrush to speed up the conversion to sagebrush steppe habitat, improving conditions for the Sagebrush Guild, and would have minimal short-term impact. The proposed treatments in Perennial Grass would have no short-term impact on the Grassland Guild.

4.4.2.1.2 Long-term Effects

Historically, Low-elevation Shrub had a relatively long fire rotation (approximately 60 to 110 years); therefore a fairly large percentage of the cover type should be mature grass and shrub that is greater than 30 years old (see Table 4-2), which provides quality habitat for the Sagebrush Guild. The <15- and 15- to 30-year age classes represent transitional (seral) states that are part of the historical ecology of sagebrush steppe. The percentage of uncharacteristic cheatgrass reflects the currently disturbed state of this vegetation type. Even though up to 20 percent of these conditions would be allowed, reducing them to a smaller percentage is desirable. The DFC cover type, which represents a historical sagebrush steppe cover type, would best benefit Sagebrush Guild species.

The current condition of the sagebrush steppe reflects the high degree of disturbance that has occurred in the past 30 years (see Table 4-2). This disturbance has resulted in a significant decline in the quality of Sagebrush Guild habitat due to invasion by Annual Grass and noxious weeds, a scarcity of mid-seral, 15- to 30-year old grass/Shrub cover types, and fragmentation of the sagebrush steppe habitat (e.g., the south and west portions of the Great Rift region). Annual grasses and noxious weeds have altered this cover type's historical fire regime and successional framework. Much of the >30-year old canopy structure remains but it lacks a quality understory. The abundance of <15-year old cover types (see Table 4-2) illustrates recent, dramatic increases in wildland fire occurrences that have expanded this age class. The scarcity of 15- to 30-year old cover types also reflects the impact of recently high frequencies of wildland fires that keeps these cover types in the early seral stage and prevents the development of an intermediate age class.

The current abundance of early seral stages, the absence of mid-seral stages, the loss of understory in late seral stages, invasion by exotic vegetation and its accompanying altered fire regimes has placed the Sagebrush Guild at risk due to overall loss of habitat (see Table 4-2). Because of changes in fire ecology and succession, these cover types would not be expected to recover sufficiently to produce quality habitat for the Sagebrush Guild without implementing treatments.

The four alternatives would improve and enhance the quality of habitats for the Sagebrush Guild species to varying degrees. While all alternatives would significantly reduce cheatgrass, Alternative D would be most effective. Alternative D would also be best in keeping a relatively large proportion of mature, >30-year grass/Shrub cover types while substantially improving the proportion of the 15- to 30-year age class. These changes would provide a better distribution of age-classes (seral stages) of improved habitats for the Sagebrush Guild and improved herbaceous understory diversity; Alternative D achieves this slightly better than the other alternatives.

For Sagebrush Guild species, the total acreage of mature, > 30-year grass/shrub Low-elevation Shrub and loss of the intermediate, 15-30-year grass/shrub are the major limiting factors in the sagebrush steppe. Current conditions emphasize the importance of the remaining >30-year age class, even though part of the understory is less than satisfactory. Alternative D would provide the largest proportion of this mature habitat for the Sagebrush Guild.

Most of the improvement accomplished by all alternatives is the replacement of uncharacteristic cheatgrass-dominated cover types to native/native-like cover types and the movement of early seral stages into more mature cover types with a shrub overstory.

4.4.2.2 Mid-elevation Shrub and Juniper

4.4.2.2.1 Short-term Effects

Alternative treatment levels in these cover types range between approximately 16,500 acres (Alternative A) and 165,000 acres (Alternative C) of sagebrush steppe, which is generally considered potential Sagebrush Guild habitat (see Table 4-34).

Mid-elevation Shrub and Juniper have been affected by reduced fire frequencies and contain practically no cheatgrass-dominated areas. This, however, has aided the expansion of juniper into Mid-elevation Shrub and the loss of sagebrush steppe habitat. Mid-elevation Shrub would have high treatment levels under Alternative C and lesser levels under the other three alternatives (see Table 4-1). In recognition of the importance of the sagebrush cover that remains today, Alternative D would treat less areas of juniper encroachment within Juniper and would disturb less intact sagebrush canopy in the Mid-elevation Shrub than Alternative C.

The greatest proportion of Source Habitat (approximately 10 percent) would be affected by Alternative D see (Table 4-1). The rationale for treatment levels within Source Habitats in Alternative D is to improve and enhance sagebrush steppe habitat. Alternative D recognizes the value of the Source Habitats that exist today to the Sagebrush Guild.

4.4.2.2.2 Long-term Effects

Historically, Mid-elevation Shrub had a short fire rotation (approximately 10 to 25 years); therefore, a smaller percentage of the cover type would be greater than 15 years old. The <5-year and 5- to 15-year age classes represent transitional (seral) states that are part of the historical ecology of Mid-elevation Shrub (see Table 4-3), with the mid-seral stage making up the greatest proportion of this cover type.

Current percentages of uncharacteristic juniper and cheatgrass (see Table 4-3) reflect the disturbed state of this cover type. Even though up to 9 percent of these uncharacteristic conditions would be allowed, reducing them to a smaller percentage is desirable. Since DFC without exotic species represents a historical sagebrush steppe cover type, this would be the most beneficial situation for the Sagebrush Guild of wildlife species by providing the necessary vegetation composition and structure for this habitat.

The current condition of Mid-elevation Shrub reflects the low degree of fire disturbance that has occurred in the past 30 years (see Table 4-3). This low degree of disturbance has resulted in a high proportion of late seral stages with dense, closed canopies and a lack of quality understory in portions of this cover type. This has affected its historical fire regime and successional framework. Mid-elevation Shrub is particularly crucial to Sagebrush Guild species since a relatively large portion of Low-elevation Shrub habitat has been adversely impacted by

cheatgrass and frequent wildland fires. The Mid-elevation Shrub needs to be carefully managed. The proposed treatment areas (see Table 4-34) were designed to improve and enhance the quality of the understory without significantly reducing shrub cover, to replace the uncharacteristic cheatgrass-dominated cover types with native/native-like cover types, and to move early seral stages into more mature cover types with a shrub overstory. The low proportions of <5-year- and 5-to-15-year-old cover types demonstrate the recent decrease in wildland fire occurrences which has resulted in the presence of virtually no early seral habitats.

The absence of early seral stages, the presence of few mid-seral stages, and the abundance of late seral stages has placed Sagebrush Guild species at risk due to overall loss of habitat quality (see Table 4-3). Under the current altered fire ecology, Mid-elevation Shrub would not recover to a satisfactory habitat quality for the Sagebrush Guild without implementing treatments.

The four alternatives would improve habitat quality for the Sagebrush Guild species to varying degrees. Alternative A provides for the least improvement, while Alternatives B, C, and D all provide for greater improvement. Alternative D retains a large proportion of mid-to-late seral sagebrush (grass/shrub) habitat in Mid-elevation Shrub for the Sagebrush Guild, which would help offset the loss in Low-elevation Shrub cover types and help meet the short-term needs of these wildlife species. Even though Alternative C more closely mimics the historical fire regime, it is not sensitive to the needs of the Sagebrush Guild.

For the Sagebrush Guild, the total acreage of the 5- to 15-year and >15-year age classes of Mid-elevation Shrub cover type is crucial. The lack of early seral stages does not adversely affect the sagebrush steppe in and of itself, yet the lack of replacement by younger-aged shrub cover types enables more cover types to reach a late seral stage which would be more vulnerable to excessive wildland fire activity that could result in a loss of these stands.

4.4.3 Analysis of Effects for the Pocatello Field Office (PFO)

4.4.3.1 Low-elevation Shrub, Perennial Grass, and Annual Grass

4.4.3.1.1 Short-term Effects

Alternative treatment levels in these cover types range between 0 acres (Alternative A) to approximately 69,000 acres (Alternative D) of sagebrush steppe, which is generally considered potential Sagebrush Guild habitat (Table 4-35).

TABLE 4-35. SAGEBRUSH STEPPE COVER TYPES AND THEIR ACREAGES IN THE POCATELLO FIELD OFFICE (PFO)

Cover type	Total Acres in PFO	Alternatives (footprint-acres)[1]			
		A[2]	B[3]	C	D
Low-elevation Shrub	38,244	0	0	2,700	18,950
Perennial Grass	108,255	0	1,300	53,300	50,200
Annual Grass	33	0	0	33	0
Mid-elevation Shrub	143,599	0	5,700	102,000	21,900
Juniper	26,102	0	3,500	18,000	10,650
Source Habitat[4]	182,263	0%	0%	23.5%	15.7%

[1] Footprint-acres describe broad treatment levels over 10 years for rehabilitation and restoration.

[2] Alternative A is the No Action Alternative, which would continue present management direction.

[3] Alternative B is the Proposed Action Alternative.

[4] Total acres of sage grouse Source Habitat and percentage of the area disturbed.

Other Notes: Fire and non-fire treatments over 10 years are also presented. Apparent precision of the acreages is a product of spreadsheet analysis.

Compared to the District's other field offices, Low-elevation Shrub, Perennial and Annual Grass cover types in the PFO have been least affected by recently increased wildland fire frequencies; and very little Low-elevation Shrub or Perennial Grass have been converted to Annual Grass (see Table 4-8). Among the four alternatives (see Table 4-35), Alternative A would have the least effect on sagebrush steppe. Alternative A would not restore any potential sagebrush steppe, while Alternative B would restore a very small proportion of sagebrush steppe. The higher treatment levels proposed in Alternative D would improve habitat quality for the benefit of the Sagebrush Guild, whereas the high treatment levels in Alternative C would restore historical fire regimes. Alternative D would improve more low-quality sagebrush steppe habitat than the other three alternatives. The proposal to treat approximately 50,000 acres of Perennial Grass under Alternative D is to re-establish sagebrush. This would result in an improvement of habitat for the Sagebrush Guild and would have minimal short-term impact on these wildlife species.

4.4.3.1.2 Long-term Effects

Historically, Low-elevation Shrub had a relatively long fire rotation (approximately 60 to 110 years); therefore, a fairly large percentage of the cover type should be mature grass and shrub that is greater than 30 years old (see Table 4-9), which provides quality habitat for the Sagebrush Guild. The <15-year and 15- to 30-year age classes represent perennial grass and grass/shrub seral stages, respectively, that are part of the historical ecology of sagebrush steppe. The percentage of uncharacteristic cheatgrass reflects the currently disturbed state of this vegetation type. Even though up to 20 percent of these uncharacteristic conditions would be allowed, reducing them to a smaller percentage is desirable. Since DFC without exotic species represents a historical sagebrush steppe cover type, this would be the most beneficial situation for the Sagebrush Guild by providing the necessary vegetation composition and structure for this habitat.

The current condition of Low-elevation Shrub reflects the high degree of disturbance that has occurred in the past 30 years (see Table 4-9). This disturbance has resulted in the scarcity of

intermediate (15- to 30-year) and mature (> 30-year) grass/shrub cover types, an overabundance of uncharacteristic cheatgrass-dominated stands, fragmentation of the sagebrush steppe habitat, increased wildland fire frequencies, and a significant decline in the quality of the habitat for the Sagebrush Guild. This currently altered fire regime has affected the historical successional framework and the ability of the sagebrush steppe ecosystem to be maintained. The >30-year old habitat lacks a quality understory. The current predominance (32 percent) of the early seral, <15-year old cover types demonstrate the current altered fire regime (see Table 4-9). The scarcity of mid-seral, 15- to 30-year old cover types (5 percent) also reflects the occurrence of frequent wildland fires that prevent early seral stages from developing into mid-seral stages (grass/shrub).

The currently altered habitat with an abundance of early seral stages, limited mid-seral stages, and degraded late seral stages has placed Sagebrush Guild species at risk. Because of changes in fire ecology and succession, these cover types would not be expected to recover quality habitat for the Sagebrush Guild without implementing proactive treatments.

The four alternatives would improve the quality of habitats for the Sagebrush Guild to varying degrees (see Table 4-9). Alternative A and Alternative B would provide the least improvement. Alternatives C and D would both provide the best improvement (i.e., mid-seral and late seral, grass/shrub) for the Sagebrush Guild, while D is slightly better (sum of mid-seral and late seral grass/shrub = 53 percent and 61 percent, respectively) and would produce the largest proportion of this mature habitat for the Sagebrush Guild.

For the Sagebrush Guild, the reduced proportions of the >30-year and 15- to 30-year cover types provide the most adverse impact to the sagebrush steppe. Even though parts of their understories are less than satisfactory, the total combination of acreages in these age classes is the most important habitat for the Sagebrush Guild in the PFO.

Most of the improvement provided by Alternatives C and D would occur through replacing the uncharacteristic cheatgrass-dominated cover types with native/native-like cover types and moving early seral stages into more mature cover types with a shrub overstory.

4.4.3.2 Mid-elevation Shrub and Juniper

4.4.3.2.1 Short-term Effects

Alternative treatment levels in these cover types range between 0 acres (Alternative A) to approximately 120,000 acres (Alternative C) of sagebrush steppe, which is generally considered potential Sagebrush Guild habitat (see Table 4-35).

Mid-elevation Shrub and Juniper have been affected by reduced wildland fire frequencies. The reduced frequencies have provided the means for Juniper to expand into Mid-elevation Shrub with the loss of sagebrush steppe habitat. Alternative C would treat more of these cover types than the other alternatives (see Table 4-35). Alternative D, in recognition of the importance of remaining sagebrush cover, would treat less areas of juniper encroachment within Juniper. It would disturb less intact sagebrush canopy in the Mid-elevation Shrub than Alternative C, but would treat more sagebrush steppe than Alternative A and Alternative B.

The greatest proportion of Source Habitat (approximately 24 percent) would be affected by Alternative C, while the more desirable treatment level (approximately 16 percent) would be found under Alternative D (see Table 4-35). Treatments within Source Habitats would improve sagebrush steppe habitat, benefiting the Sagebrush Guild by not reducing shrub canopy.

4.4.3.2.2 Long-term Effects

Historically, Mid-elevation Shrub had a short fire rotation (approximately 10 to 25 years); therefore, under DFC, a small percentage of the cover type would be greater than 15 years old (see Table 4-10). The <5-year and 5- to 15-year age classes represent transitional seral states that are part of the historical ecology of Mid-elevation Shrub with the mid-seral stage making up the greatest proportion of this cover type.

The percentages of uncharacteristic juniper and cheatgrass reflect the current disturbed state of this cover type. Even though up to 9 percent of these uncharacteristic conditions would be allowed, reducing them to a smaller percentage is desirable. Since DFC represents a historical sagebrush steppe cover type, this would be the most beneficial situation for the Sagebrush Guild by providing the necessary vegetation composition and structure for this habitat.

The current condition of Mid-elevation Shrub reflects the low degree of fire disturbance that has occurred in the past 30 years (see Table 4-10). This low degree of disturbance has resulted in a higher (61 percent) than desirable (23 percent) percentage of late seral stages. Due to the loss of Low-elevation Shrub through recent wildland fires, however, this Mid-elevation Shrub is crucial to the Sagebrush Guild; and, therefore, needs to be carefully managed. The proposed treatments would improve the quality of the understory without significantly reducing shrub cover and replace uncharacteristic cheatgrass-dominated cover types with native/native-like cover types, reducing juniper encroachment and moving early seral stages into more mature cover types with a shrub overstory. The current percentages of <5-year old cover types (16 percent) and 5- to 15-year old cover types (7 percent) illustrate the lack of wildland fire in these age classes and reflect little-to-no succession from early seral to higher successional states in the past 30 years.

The amount of early seral stages, presence of few mid-seral stages, and abundance of late seral stages in this cover type has placed the Sagebrush Guild at risk due to an overall loss of habitat quality and an increased potential for catastrophic wildland fire. All alternatives would have practically the same effect on perennial grasses and their related wildlife species. Alternative A and Alternative B would permit small increases in Juniper, but this would exacerbate juniper encroachment in the PFO. Alternative A and Alternative B would do little to change current conditions, leaving habitat quality to decline with juniper encroachment. Alternatives C and D would significantly increase the 5-to-15-year grass/shrub cover type and retain more than half of the >15-year grass/shrub cover type. These two alternatives would increase the combined percentages of the grass/shrub components (72 percent and 73 percent, respectively), which would benefit Sagebrush Guild species. For the Sagebrush Guild, the total percentages of the 5- to 15-year and >15-year age classes within Mid-elevation Shrub are crucial. The lack of early seral stages does not adversely affect the sagebrush steppe in and of itself, yet the lack of replacement by younger-aged shrub cover types enables more cover types to reach a late seral stage which would be more vulnerable to excessive wildland fire activity that could result in a loss of these stands.

In returning wildland fire to a more historical role in the ecosystem, a greater proportion of Alternative C treatments would occur outside of Sagebrush Guild habitats; those treatments within guild habitats would maintain less shrub cover than Alternative D. Alternative C is not designed to be sensitive to the needs of the Sagebrush Guild. On the other hand, Alternative D would enhance and restore the current shortage of sagebrush steppe, recognizing that remaining habitats are crucial to maintenance of remaining Sagebrush Guild populations. Treatment-acres

in Alternative D would be located on the landscape to have the maximum benefit in restoring Sagebrush Guild habitats.

4.4.4 Analysis of Effects for the Burley Field Office (BFO)

4.4.4.1 Low-elevation Shrub, Perennial Grass, and Annual Grass

4.4.4.1.1 Short-term Effects

Alternative treatment levels in these cover types range between approximately 50,000 acres (Alternative B) and 185,000 acres (Alternative C and D) of sagebrush steppe (Table 4-36), which is generally considered potential Sagebrush Guild habitat.

Table 4-36. Sagebrush Steppe Cover Types and Their Acreages in the Burley Field Office (BFO)

Cover type	Total Acres in BFO	Alternatives (footprint-acres)[1]			
		A[2]	B[3]	C	D
Low-elevation Shrub	164,756	25,175	15,750	26,300	29,300
Perennial Grass	309,128	57,625	9,600	109,600	107,300
Annual Grass	49,150	15,925	24,850	49,069	48,850
Mid-elevation Shrub	162,524	7,575	14,200	106,063	72,500
Juniper	59,480	800	24,650	39,229	17,600
Source Habitat[4]	172,396	0	2.6%	13.7%	12.4%

[1] Footprint-acres describe broad treatment levels over 10 years for rehabilitation and restoration.
[2] Alternative A is the No Action Alternative, which would continue present management direction.
[3] Alternative B is the Proposed Action Alternative.
[4] Total acres of sage grouse Source Habitat and percentage of the area disturbed.
Note: Apparent precision of the acreages is a product of spreadsheet analysis.

Most of the Low-elevation Shrub, Perennial and Annual Grass cover types in the BFO have been affected by increased wildland fire frequencies. Among the four alternatives, A would do the least to restore cheatgrass and would restore a moderate level of Perennial Grass and Low-elevation Shrub (see Table 4-36). Alternative B would do less to fix the deficiencies in the Low-elevation Shrub and Perennial Grass, with a moderate increase of treatments in Annual Grass. The magnitude of treatments in Alternatives C and D would be similar in the Low-elevation Shrub, Perennial and Annual Grass cover types.

Conversion of the sagebrush steppe to Annual and Perennial Grass cover types has had a major impact on the sagebrush ecosystem. Annual Grass provides minimal habitat values for the Sagebrush Guild. Perennial Grass is a mixture of exotic and native grasses, which provides essential habitat for the Grassland Guild species, but not Sagebrush Guild species. Some of the older, exotic perennial seedings have been extensively re-invaded by sagebrush and are beginning to provide suitable habitat values for the Sagebrush Guild. The proposal to treat more than 100,000 acres of Perennial Grass (see Table 4-36) under Alternatives C and D would facilitate the restoration of sagebrush steppe habitat and would have minimal short-term impacts. The proposed treatments in Perennial Grass would have no significant short-term impact on the Grassland Guild.

4.4.4.1.2 Long-term Effects

Historically, Low-elevation Shrub had a relatively long fire rotation (approximately 60 to 110 years); therefore, a fairly large percentage of the cover type should be mature grass and shrub that is greater than 30 years old (see Table 4-16), which provides quality habitat for the Sagebrush Guild. The <15-year and 15- to 30-year age classes represent transitional (seral) states that are part of the historical ecology of Low-elevation Shrub. The percentage of uncharacteristic cheatgrass reflects the currently disturbed state of this vegetation type. Even though up to 20 percent of these uncharacteristic conditions would be allowed, reducing them to a smaller percentage is desirable. Since DFC without exotic species represents a historical sagebrush steppe cover type, this would be the most beneficial situation for the Sagebrush Guild by providing the necessary vegetation composition and structure for this habitat.

The current condition of this cover type reflects the high degree of disturbance that has occurred in the past 30 years (see Table 4-16). This disturbance has resulted in the scarcity of intermediate (15 to 30 years) and mature (> 30-years) grass/shrub cover types, an overabundance of uncharacteristic cheatgrass-dominated stands (e.g., the desert north of Minidoka), fragmentation of the sagebrush steppe habitat, increased wildland fire frequencies, and a significant decline in the quality of the habitat for the Sagebrush Guild. This currently altered fire regime has affected the historical successional framework and the ability of the sagebrush steppe ecosystem to be maintained. These impacts have affected its historical fire regime and successional framework. The >30-year old habitat lacks quality understory. The scarcity of intermediate, 15- to 30-year grass/shrub cover types and the abundance of <15-year old cover types reflect the recent dramatic increase in wildland fire occurrences, which have resulted in cheatgrass-dominated areas, and little successional transition into the mid-seral, 15-to-30-year-old age class.

An abundance of early seral stages, a near absence of mid-seral stages, and the degradation of late seral stages have placed the Sagebrush Guild at risk from an overall loss of habitat. Adversely affected by changes in fire regime and succession, Low-elevation Shrub would not be expected to recover sufficiently to produce quality habitat for the Sagebrush Guild without implementing treatments.

The four alternatives would improve habitat quality for the Sagebrush Guild to varying degrees. Alternative A and Alternative B would have little-to-no effect on the present conditions of Low-elevation Shrub, Perennial and Annual Grass (see Table 4-16) in the BFO. Alternatives C and D would both improve habitat quality. Alternative D, however, would provide slightly more acres in mid-seral stages than Alternative C. Alternatives C and D, equally would maintain the current >30-year, mature grass/shrub cover types and provide the greatest reductions in cheatgrass from 33 percent to 10 percent composition. Alternative D would make the largest increase in the mid-seral (15 to 30 years) cover types. Restoration of these acres to sagebrush steppe would significantly increase habitat quality for Sagebrush Guild species.

For the Sagebrush Guild, total acreage of mature, late seral Low-elevation Shrub is the most limiting factor in this habitat. Even though part of the understory is less than satisfactory, the total acreage of late and mid-seral grass/shrub mixture stages (>30-year and 15- to 30-year age classes) is the most important habitat factor. Alternative D would result in the greatest increase in acres of these two age classes.

Most of the improvement from the current situation provided by the alternatives would occur in replacing the uncharacteristic cheatgrass-dominated cover types to native/native-like cover types and moving early seral stages into more mature cover types with a shrub overstory.

4.4.4.2 Mid-elevation Shrub and Juniper

4.4.4.2.1 Short-term Effects

Alternative treatment levels in these cover types range between approximately 8,400 acres (Alternative A) and 145,000 acres (Alternative C) of sagebrush steppe (see Table 4-36), which is generally considered potential Sagebrush Guild habitat.

Mid-elevation Shrub and Juniper in the BFO have been affected by reduced wildland fire frequencies and areas of juniper encroachment within Juniper (e.g., portions of the Upper Raft River Valley) resulting in the loss of sagebrush steppe habitat. Alternative A would do the least to restore Mid-elevation Shrub and areas of juniper encroachment within Juniper. Alternative B would provide a moderate increase of treatments in Mid-elevation Shrub, yet permit a significant increase in juniper encroachment.

Similar to Low-elevation Shrub (above), treatment levels in Alternative C would be higher than in the other alternatives. Nevertheless, Alternative D would treat large areas of potential sagebrush steppe (approximately 18,000 acres of juniper encroachment); but it would treat less juniper encroachment within Juniper and disturb less intact sagebrush canopy than Alternative C. Compared to Alternative C, D would have less effect on Mid-elevation Shrub and Juniper.

In returning fire to a more historical role in the ecosystem, a greater proportion of treatments in Alternative C would occur outside of Sagebrush Guild habitats; those treatments within guild habitats would maintain less shrub cover than Alternative D. Alternative C would not be sensitive to the needs of the Sagebrush Guild. Under Alternative D, treatments would enhance sagebrush steppe habitat and would attempt to address its current shortage, recognizing that remaining habitats are crucial to the maintenance of remaining Sagebrush Guild populations. Treatment-acres in Alternative D would be located on the landscape for maximum benefit in restoring Sagebrush Guild habitats.

Approximately 12 percent of sage grouse Source Habitats would be affected by Alternative D (see Table 4-36). The rationale for treatment levels within Source Habitats in Alternative D is to improve and enhance sagebrush steppe habitat. Alternative D recognizes the value of the Source Habitats that exist today to the Sagebrush Guild.

4.4.4.2.2 Long-term Effects

Historically, Mid-elevation Shrub had a short fire rotation (approximately 10 to 25 years); therefore, a relatively small percentage of the cover type should be greater than 15 years old (see Table 4-17). The <5-year and 5- to 15-year age classes represent early and mid-seral seral stages that are part of the historical ecology of Mid-elevation Shrub, with the mid-seral stage making up the greatest proportion of this cover type. The percentages for juniper and cheatgrass in Table 4-17 reflect the current disturbed state of this cover type. Even though up to 9 percent of these uncharacteristic conditions would be allowed, reducing them to a smaller percentage is desirable. Since DFC without exotic species represents a historical sagebrush steppe cover type, this would be the most beneficial situation for the Sagebrush Guild.

The current condition of this cover type reflects both large areas that have experienced too much wildland fire and smaller areas that have not experienced enough wildland fire in the past 30 years (see Table 4-17), both situations exist in the South Hills. This has produced fragmentation of the sagebrush steppe and a decline in habitat quality that is further aggravated, in part, by juniper encroachment within Juniper and the invasion of Annual Grass and noxious weeds (see Table 4-17). These altered cover types have affected Mid-elevation Shrub's historical fire regime and successional framework. The limiting factor in the >15-year old habitat is primarily the loss of sagebrush from juniper encroachment. The current low percentage of <5-year cover types (1 percent) and 5- to 15-year old cover types (6 percent) reflects the lack of wildland fire in these age classes and the little-to-no succession from early seral to higher successional states in the past 30 years.

The current lack of early seral stages, the presence of few mid-seral stages, and the abundance of mature, late seral stages has placed the Sagebrush Guild at risk by loss of habitat from catastrophic wildland fires. Furthermore, encroachment by juniper and the invasion of exotic species have affected this cover type's historical fire regime and successional framework.

The four alternatives would improve habitat quality for Sagebrush Guild species to varying degrees. Alternative A would provide the least improvement, Alternative B would do only slightly better than Alternative A (see Table 4-17). Alternative D would provide for the greatest improvement in habitat quality. Alternative D would create the largest portions of mid- and late seral sagebrush habitats for the Sagebrush Guild. For improving the Mid-elevation Shrub cover type, Alternative C would reduce most of the >15-year age class from 63 percent to 40 percent, while Alternative D would reduce it to 48 percent. Most of the improvement under Alternatives C and D would be in the increase of the <5-year and 5- to 15-year age classes, the reduction of the >15-year age class, and the replacement of the uncharacteristic juniper and cheatgrass-dominated cover types with native/native-like cover types, which would facilitate the movement of early seral stages into more mature cover types with a shrub overstory.

In returning fire to a more historical role in the ecosystem, a greater proportion of Alternative C treatments would occur outside of Sagebrush Guild habitats; those treatments within guild habitats, however, would maintain less shrub cover than under Alternative D. Alternative C would not be sensitive to the needs of the Sagebrush Guild. Under Alternative D, treatments would enhance sagebrush steppe habitat and would attempt to address its current shortage, recognizing that remaining habitats are crucial to the maintenance of remaining Sagebrush Guild populations. Treatment-acres in Alternative D would be located on the landscape for maximum benefit in restoring Sagebrush Guild habitats.

4.4.5 Analysis of Effects for the Shoshone Field Office (SFO)

4.4.5.1 Low-elevation Shrub, Perennial Grass, and Annual Grass

4.4.5.1.1 Short-term Effects

Alternative treatment levels in these cover types range between approximately 109,000 acres (Alternative A) and 534,000 acres (Alternative C) of sagebrush steppe, which is generally considered potential Sagebrush Guild habitat (Table 4-37).

TABLE 4-37. SAGEBRUSH STEPPE COVER TYPES AND THEIR ACREAGES IN THE SHOSHONE FIELD OFFICE (SFO)

Cover type	Total Acres in SFO	Alternatives (footprint-acres)[1]			
		A[2]	B[3]	C	D
Low-elevation Shrub	415,308	5,525	84,000	62,831	112,230
Perennial Grass	548,807	96,505	70,500	193,619	113,500
Annual Grass	281,362	6,700	102,500	281,362	281,600
Mid-elevation Shrub	311,194	850	17,550	200,000	58,000
Juniper	4	0	0	0	0
Source Habitat[4]	332,187	0	0	2.3%	8.5%

[1] Footprint-acres describe broad treatment levels over 10 years for rehabilitation and restoration.

[2] Alternative A is the No Action Alternative, which would continue present management direction.

[3] Alternative B is the Proposed Action Alternative.

[4] Total acres of sage grouse Source Habitat and percentage of the area disturbed.

Other Notes: Fire and non-fire treatments over 10 years are also presented. Apparent precision of the acreages is a product of spreadsheet analysis.

Most of the Low-elevation Shrub, Perennial and Annual Grass cover types in the SFO have been affected by increased wildland fire frequencies. Among the four alternatives (see Table 4-37), A would have the least effect on sagebrush steppe, would do little to restore cheatgrass-dominated areas and Perennial Grass, and would do little to reconnect areas of relatively intact sagebrush canopy (Low-elevation Shrub). Treatment levels in Alternative B would be intermediate. The higher treatment levels proposed in Alternatives C and D would correct existing, altered ecological conditions. Since large acreages are now of low quality, both Alternatives C and D would improve more sagebrush steppe than the other alternatives; but Alternative D would affect less intact shrub canopy than Alternative C.

In returning fire to a more historical role in the ecosystem, a greater proportion of Alternative C treatments would occur outside of Sagebrush Guild habitats; treatments within guild habitats would maintain less shrub cover than under Alternative D. Alternative C would not be sensitive to the needs of the Sagebrush Guild. Under Alternative D, treatments would enhance sagebrush steppe habitat and would attempt to address its current shortage, recognizing that remaining habitats are crucial to the maintenance of remaining Sagebrush Guild populations. Treatment-acres in Alternative D would be located on the landscape for maximum benefit in restoring Sagebrush Guild habitats.

In the SFO, conversion of sagebrush steppe to Annual Grass has been significantly greater than in the other field offices. At lower elevations, Perennial Grass is predominately seeded grassland and provides habitat for Grassland Guild species. Alternative D would treat approximately 114,000 acres of sagebrush steppe habitat to enhance the conversion of Perennial Grass to sagebrush steppe habitat and would have minimal short-term impact. The proposed treatments in Perennial Grass would have no significant short-term impact on the Grassland Guild.

4.4.5.1.2 Long-term Effects

Historically, Low-elevation Shrub had a relatively long fire rotation (approximately 60 to 110 years); therefore, a fairly large percentage of the cover type should be mature grass and shrub

that is greater than 30 years old (see Table 4-24). This mature vegetation provides quality habitat for the Sagebrush Guild. The <15-year and 15- to 30-year age classes represent early and mid-seral stages that are part of the historical ecology of Low-elevation Shrub. The percentage of uncharacteristic cheatgrass reflects the currently disturbed state of this vegetation type. Even though up to 20 percent of these uncharacteristic conditions would be allowed, reducing them to a smaller percentage is desirable. Since DFC without exotic species represents a historical sagebrush steppe cover type, this would be the most beneficial situation for the Sagebrush Guild by providing the necessary vegetation composition and structure for this habitat.

The current condition of Low-elevation Shrub reflects the high degree of disturbance that has occurred in the past 30 years (see Table 4-24) and the current scarcity of mature grass/Shrub cover types in the SFO. Disturbance has resulted in fragmentation of the sagebrush steppe habitat and a significant decline in habitat quality due to the loss of the mature shrub canopy and the invasion of Annual Grass and noxious weeds. These species have affected this cover type's historical fire regime and successional framework. The limiting factors in the >30-year old habitat is primarily the scarcity of sagebrush cover across the landscape and the lack of quality understory. The near absences of early <15-year old and intermediate 15-to-30-year old cover types also illustrate the recent dramatic increases in wildland fires in Low-elevation Shrub, which have resulted in an abundance of cheatgrass-dominated vegetation and an altered fire ecology in which sagebrush is limited in its ability to replace itself.

The current abundance of uncharacteristic cheatgrass communities, which accounts for 42 percent (see Table 4-24) and near absence of early- and mid-seral communities, about 5 percent (Table 4-24) have placed the Sagebrush Guild species at risk due to overall loss of habitat. Because of changes in fire ecology and succession, Low-elevation Shrub would not be expected to recover sufficiently to produce quality habitat for the Sagebrush Guild without implementing proactive treatments.

The four alternatives would improve habitat quality for Sagebrush Guild species to varying degrees. Alternative C would be best at maintaining the current proportion of mature grass/Shrub cover types for the Sagebrush Guild, while the other alternatives would permit some losses of this habitat. Alternative D, on the other hand, would be slightly better in restoring early and mid-seral stages and reducing the abundance of cheatgrass. For the Sagebrush Guild, the total acreage of the mature, >30-year grass/shrub cover type is the most limiting factor in the sagebrush steppe. Even though part of the >30-year age class understory is less than satisfactory, the total acreage of >30-year age classes is the most important habitat factor. Alternative A and Alternative B would have the greatest negative impact on the Sagebrush Guild due to permitting large reductions in the mature habitat, >30-year age classes, from 28 percent to 12 and 14 percent, respectively. Alternative D would have an intermediate impact on mature habitat, while Alternative C would more or less maintain the existing mature sagebrush cover >30 years old.

Most of the improvement under all alternatives would be to replace the uncharacteristic cheatgrass-dominated cover types with native/native-like cover types and to move early seral stages into more mature cover types with a shrub overstory.

4.4.5.2 Mid-elevation Shrub and Juniper

4.4.5.2.1 Short-term Effects

In the SFO, alternative treatment levels in these cover types range between 850 acres (Alternative A) and 200,000 acres (Alternative C) of sagebrush steppe, which is generally considered potential Sagebrush Guild habitat (see Table 4-37).

Mid-elevation Shrub and Juniper have been affected by increased wildland fire frequencies. This has caused the loss of sagebrush steppe habitat. Alternative C would treat more acres than the other alternatives (see Table 4-25). Alternative D, in recognition of the importance of remaining sagebrush cover, would disturb less intact sagebrush canopy in the Mid-elevation Shrub than Alternative C.

The greatest proportion of sage grouse Source Habitat (approximately 9 percent) would be affected by the Alternative D (see Table 4-37). The rationale for treatment levels within Source Habitats (e.g., Laidlaw Park) in Alternative D is to improve and enhance sagebrush steppe habitat. Alternative D recognizes the value of the Source Habitats that exist today to the Sagebrush Guild.

4.4.5.2.2 Long-term Effects

Historically, Mid-elevation Shrub had a short fire rotation (approximately 10 to 25 years); therefore, a smaller percentage of the cover type would be greater than 15 years old (see Table 4-25). The <5-year and 5- to 15-year age classes represent early to mid-seral stages that are part of the historical ecology of Mid-elevation Shrub, with the mid-seral stage making up the greatest proportion of this cover type.

The percentages of uncharacteristic juniper and cheatgrass reflect the current disturbed state of the Mid-elevation Shrub (see Table 4-25). Even though up to 9 percent of these uncharacteristic conditions would be allowed, reducing them to a smaller percentage is desirable. Since DFC without exotic species represents a historical sagebrush steppe cover type, this would be the most beneficial situation for the Sagebrush Guild by providing the necessary vegetation composition and structure for this habitat.

The current condition of Mid-elevation Shrub reflects the moderate degree of wildland fire disturbance that has occurred in the past 30 years. This moderate degree of disturbance has resulted in a higher (40 percent) than desirable (23 percent) percentage of early seral stages. Because of the loss of Low-elevation Shrub through recent wildland fires, this existing Mid-elevation Shrub is crucial to the maintenance of the Sagebrush Guild; it therefore needs to be carefully managed. The proposed level of treatments under Alternatives C and D (see Table 4-37) would improve and enhance the quality of the understory without significantly reducing shrub cover, while replacing the uncharacteristic cheatgrass-dominated cover types with native/native-like cover types and moving early seral stages into more mature cover types with a shrub overstory. The current low percentage of 5-to-15-year old cover types illustrates the combination of recent wildland fire occurrences and the lack of succession from early seral in the past 30 years.

The abundance of early seral stages (40 percent), the presence of few mid-seral stages (2 percent), and the abundance of decadent, late seral stages (54 percent) have placed the Sagebrush Guild at risk from overall loss of habitat quality. All four alternatives would cause similar long-term impacts to the Sagebrush Guild, though Alternative D would provide the highest percentage

of grass/shrub cover type restoration, which would benefit the Sagebrush Guild by providing the necessary vegetation composition and structure for this habitat. All alternatives would result in an increase in the 5- to 15-year grass/shrub age class through treatments in <5-year Perennial Grass. This conversion would have a positive effect on habitat for the Sagebrush Guild by providing the necessary vegetation composition and structure for this habitat.

4.4.6 Mitigation and Monitoring

The management restrictions listed in Section 2.4.3.3, Fire Management Restrictions are incorporated into management practices common to all alternatives. These practices would be implemented to avoid adverse impacts to vegetation. Because of this, no further mitigation would be required to protect the vegetation resource.

Prior to any vegetation treatment, preparation of site-specific NEPA would occur. The impacts analysis would include consideration for special status plant species and habitats, including mitigation to prevent significant adverse impacts to these species. Management restrictions for special status species are found in Section 2.4.3.3, Fire Management Restrictions.

4.4.7 Unavoidable Adverse Impacts

The action alternatives would result in unavoidable short-term impacts to sagebrush steppe wildlife habitat during vegetation treatments as described above. However, this unavoidable impact mimics a natural disturbance and succession pattern that will have long-term benefits on this resource.

4.4.8 Irretrievable and Irreversible Commitment of Resources

The action alternatives would result in irretrievable short-term losses to sagebrush steppe wildlife habitat during vegetation treatments as described above. However, theses losses are not irreversible and would be restored through implementation of a rehabilitation and restoration program as described in Chapter 2.

4.4.9 Cumulative Effects

Settlement of the Snake River Plain and Southeast Idaho resulted in significant fragmentation of the sagebrush ecosystem into two large blocks of habitat and several small isolated populations of Sagebrush Guild species. A large block of sagebrush steppe remained north of the Snake River, generally within the Bennett Hills-Big Desert region and extending to and beyond the St. Anthony Dunes region. These areas have been further fragmented by agricultural development. South of the Snake River, the sagebrush steppe ecosystem was somewhat fragmented due to the influences of the Basin and Range, mountain and valley topography. Settlement of many of the valley areas further isolated the sagebrush steppe habitats to the mountains and foothills. Some of these areas are connected to sagebrush habitats to the south in Utah and Nevada. Other habitats were completely isolated from other sagebrush areas. Only the public land corridor extending north and south through the Lake Walcott, Minidoka National Wildlife Refuge area is capable of providing a continuous habitat link north to south across the Snake River. Unfortunately this area has been converted to exotic annual and Perennial Grass through its recent history of wildland fires.

As a result of habitat fragmentation, less mobile populations of wildlife have been isolated from other populations of the same species. Mobile species had access to large habitat areas until the large-scale wildland fires that began to regularly occur in the 1990s. In the District, there was a

large Sagebrush Guild population in the Big Desert and adjacent areas north of the Snake River, and numerous, mostly fragmented, populations south and east of the river. The Big Desert area provided habitat for all Sagebrush Guild species except for the California bighorn sheep. All of these populations were generally considered to be healthy and viable until the wildland fire proliferation began. As the result of these vast burned areas and the invasion of cheatgrass and noxious weeds, there is now significant concern for many wildlife populations, particularly sage grouse, pygmy rabbit, and others as well.

The wildlife populations in the fragmented habitats are all facing great risk to their prolonged viability due to genetic isolation and general inadequacy of habitat quality and quantity. Sedentary and wide-ranging species both face serious risk. Sedentary species are very sensitive to patch size and are at risk due to habitat loss and fragmentation and population isolation. Wide-ranging species, that need large landscape habitats, such as sage grouse and pronghorn antelope, may be able to utilize some remaining habitat fragments if they are not too isolated, but are still very significantly affected by the overall loss of habitat. (USGS 2004)

All alternatives would treat existing and potential sagebrush steppe cover types and wildlife habitats. Alternative A, however, would be ineffectual in improving sagebrush habitat for the Sagebrush Guild. Alternative B would have a more beneficial effect, while Alternatives C and D would have the greatest beneficial effects. Although the footprint-acreage of Alternative C is large, there is no particular landscape strategy proposed to maximize the benefit of these treatments to the Sagebrush Guild. Only Alternative D contains a landscape strategy that would not treat intact shrub canopy in sage grouse Source Habitats and would provide the greatest benefit to sage grouse and the Sagebrush Guild by providing the necessary vegetation composition, continuity, and structure for this habitat.

Environmental and non-environmental factors (e.g., weather, predation, disease, forage competition, hunter harvest, and loss of suitable habitat on private lands from urban expansion and agricultural development) may limit the productivity and viability of Sagebrush Guild species, including sage grouse, over the long term.

Habitat conditions on adjacent NFS lands (including management of roads and fuels treatments) may also affect the Sagebrush Guild species dependent on both NFS and adjacent public lands. However, due to relatively low amounts of sagebrush habitat on NFS lands, actions there would have less affect to the Sagebrush Guild populations than the adjacent BLM-administered lands, which generally have much less resilient conditions and more significant acreages of sagebrush habitats.

Implementation of management direction that improves vegetation conditions would contribute to improving habitat for the Sagebrush Guild, while maintaining and/or improving populations of Sagebrush Guild species. Emphasis on suppression of wildland fires on public, private, state, and NFS lands in the District would continue to be emphasized at present levels until NEPA was performed for site-specific projects.

Due to the emphasis of treatments, some species of the Sagebrush Guild may decline or be displaced to adjacent sagebrush areas in the short term. FMDA stipulations on sagebrush steppe cover types, buffer zones around riparian areas, sensitive raptor nests, the maintenance of sage grouse Source Habitat and other sagebrush steppe and fire management actions would assist in mitigating these declines.

4.5 ANALYSIS OF EFFECTS ON WILDLIFE RESOURCES AND SPECIAL STATUS SPECIES

To facilitate the analysis of existing wildlife resources at the District-wide level required for this EIS, it was decided to categorize wildlife species into guilds associated with the cover types described in Section 3.2, Cohesive Strategy and Vegetation Resources (Issue 1). This allows the analysis to focus impacts analysis on key wildlife species representative of the typical wildlife species that use each cover type. Impacts to special-status plant species within these cover types are also described in this section.

4.5.1 ANNUAL GRASS HABITAT

Representative species in the District that inhabit or use the Annual Grass cover type include the long-billed curlew and burrowing owl.

Burrowing owl would likely experience some positive impacts from fuels and vegetation treatments. These treatments would cause the short-term removal of vegetation, which would open areas for foraging. Open areas also benefit large areas with little cover for predators. However, mechanical and RxFire/WFU treatments also have the potential to cause some individual mortality. It should be noted that management restrictions that apply to all alternatives impose time constraints on fire management activities in habitat supporting nesting raptors. These restrictions include limited or no management treatments during nesting season in raptor and breeding and nesting areas. These management restrictions would minimize potential short-term impacts from all alternatives on burrowing owl reproductive success.

Although curlew typically inhabit areas near water sources and riparian habitats, they also use grasslands for nesting. Within the District, nesting habitat for curlew is primarily grasslands. Accordingly, it is possible that some nest mortality could occur from mechanical treatment or RxFire/WFU. Additionally, treatments in uplands occupied by curlew could have some impact on upland forage used by curlew. Adverse impacts to long-billed curlew can be minimized by avoiding treatments during the nesting season within favored nesting areas. Habitat would likely be poor the year following treatments, but should be productive curlew habitat in the following years. Since curlew do not require or prefer dense grassland vegetation for nesting, their use of treated habitats should quickly reestablish. However, it is possible that some nest mortality or bird displacement could occur from mechanical treatment, RxFire, or WFU.

Under Alternative A, approximately 22,600 acres of Annual Grass habitat would be treated. In contrast, Alternative B would treat approximately 127,300 acres, and Alternative C and D would treat 330,500 acres each. Accordingly, Alternative A would provide the least short-term loss of habitat to burrowing owl, and curlew, followed by Alternative B and Alternatives C and D, respectively. Long-term alternative impacts on these species would be similar throughout the District as all alternatives provide similar percentages of the early seral stages that provide the low-ground cover with open areas that these species use. Additionally, all alternatives would result in FRCC 2 in this cover type, resulting in a moderate risk of long-term loss of ecosystem components that support these species. An exception would be in the PFO, where Alternatives C and D provide almost twice as much early seral stage grassland than Alternative A and Alternative B. It should also be noted that effective restoration and rehabilitation would replace a large percentage of existing cheatgrass in Annual Grass habitat with Perennial Grass and forbs. These plants are typically of much more forage value for the rodents, small birds, and lizards that

are the potential prey of burrowing owl. Accordingly, Alternatives C and D would have the greatest long-term benefit to burrowing owl, followed by Alternative B, and Alternative A, respectively.

4.5.2 Perennial Grass Habitat

Representative wildlife species that inhabit the Perennial Grass cover type include California bighorn sheep, Columbian sharp-tailed grouse, meadowlark, short-eared owl, and Montane vole.

Fire management activities can result in short-term disturbance to bighorn sheep, as well as removing Perennial Grass cover types that bighorn sheep rely on for forage. However, these treatments typically would be concentrated in areas where cheatgrass invasion has occurred; therefore the treatments would likely be removing a cover type with limited forage value for bighorn sheep and replacing it with a higher value forage in the form of native perennials or perennial placeholder species such as crested wheatgrass. Bighorn sheep generally occur in steep, rocky habitat that has limited potential for treatments other than RxFire and WFU.

Vegetation treatments in Perennial Grass habitat occupied by sharp-tailed grouse can result in individual mortality and nest mortality. Removal of cover vegetation during RxFire or mechanical and chemical treatment would also likely increase predation risk on sharp-tailed grouse by decreasing refuge. Long-term benefits for vegetation treatment would include the restoration of cheatgrass-infested areas with forbs, native perennial grass species, and placeholder species with greater forage benefit.

Vegetation treatments is Perennial Grass habitat occupied by western meadowlark would have similar impacts to those described for sharp-tailed grouse. Meadowlarks typically are ground-foragers and nesters and any large-scale disturbances such as mechanical treatments or controlled burns, can result in individual and nest mortality. As with the sharp-tailed grouse, long-term benefits of treatment would result from increased forage quality.

Short-eared owls appear to be negatively affected by the use of pesticides. Accordingly, chemical treatments under any of the alternatives have the potential to increase owl mortality. However, mechanical and controlled burn treatments, while contributing to individual mortality, would also open up areas, allowed owls to hunt more effectively then they would in areas with a preponderance of late seral-stage shrub habitat.

Montane voles would be susceptible to mortality from mechanical treatments. Harrowing, disking, and drilling all have the potential to destroy vole burrows and runways, as well as causing individual mortality. Controlled burns would also contribute to vole mortality. Long-term benefits to voles would be similar to those described for the meadowlarks and grouse; an improvement in forage quality and quantity.

Alternatives C and D would have the highest amount of treatment in Perennial Grass with 528,400 acres each. Alternative B would have the next highest with 134,000 acres of treatment, followed by Alternative A with 155,900 acres. Accordingly, Alternatives C and D would have the greatest short-term risk to wildlife species inhabiting Perennial Grass habitat, followed by Alternative B and C, respectively. Conversely, Alternatives C and D are likely to have the greatest long-term benefit to wildlife occupying this habitat by insuring that large areas of Perennial Grass are treated as needed to halt the invasion of cheatgrass and by opening up areas previously dominated by decadent shrub stands. Long-term risk of loss of key ecosystem

components supporting wildlife in this guild would be similar for all alternatives since all alternatives would result in FRCC 2.

It should be noted that management restrictions that apply to all alternatives impose time constraints on fire management activities in habitat supporting nesting raptors and sharp-tailed grouse. These restrictions include limited or no management treatments during nesting season in raptor and grouse breeding and nesting areas. Restrictions on winter and early spring vegetation treatments would also be implemented in sharp-tailed grouse wintering habitats. These management restrictions would further reduce potential short-term impacts from all alternatives on the population viability of sharp-tailed grouse and short-eared owls.

4.5.3 Low- and Mid-elevation Shrub Habitat

The representative guild species for Low- and Mid-elevation Shrub cover type in the District include pronghorn, pygmy rabbit, greater sage grouse, sage sparrow, sagebrush lizard, and short-horned lizard. Please note that the potential impacts to this guild are discussed at the field office level in Section 4.4, Analysis of the Effects on the Sagebrush Steppe Ecosystem (Issue 2).

As with other big game, antelope may be displaced after fire and vegetation treatments due to the lack of forage and cover. However, once vegetation in treatment areas begins to regenerate, many wildlife species are often attracted to the area to take advantage of the newly sprouted forage. A reduction of cover in the Low- and Mid-elevation Shrub types have also been shown to allow pronghorn better visibility, decreasing predation and allowing them to expand their area of use (Woodard and Van Nest 1990, MacPhee 1991). Similar to other treatment methods, Short-term indirect impacts associated with vegetation treatments may include disturbance from increased traffic and noise from mechanical equipment, which may displace pronghorn from the treatment area.

As with other small mammals, short-term impacts from fuels and vegetation treatments include loss of habitat and individual mortality. Clearing would also decrease cover, potentially increasing predation on pygmy rabbit. However, restoration and rehabilitation of these cover types would increase forage quality by eliminating cheatgrass and replacing it with perennial grasses, forbs, and placeholder species with higher forage value, such as crested wheatgrass.

A large, high-intensity fire may be extremely detrimental to wildlife species such as mule deer, greater sage grouse, sage sparrow, and the pygmy rabbit, which rely largely on climax sagebrush cover types. Vegetation treatments have been shown to be an effective tool to enhance some greater sage grouse brooding habitat, particularly in areas where sagebrush is nearby and abundant, a "good" population of native forbs is present, and exotic plant species are limited (Miller and Eddleman 2000). However, sage grouse nesting, cover, and wintering habitats should be protected from wildland fire (Robertson 1991, Fischer 1994). Any wildland fire in Wyoming big sage, which is associated with the Low-elevation Shrub cover type, would likely negatively impact greater sage grouse populations across the District, especially during periods of drought (Miller and Eddleman 2000). Similar to other treatment methods, indirect impacts associated with vegetation treatments may include disturbance from increased traffic and noise from mechanical equipment, which may displace wildlife from the treatment area.

Both the sagebrush lizard and short-horned lizard would experience short-term habitat loss from vegetation treatments. Individual mortality from vegetation treatments could also occur due to the lizard's limited mobility and tendency to use low shrubs, rocks and loose soil for refuge when

threatened. Clearing associated with vegetation treatments would also decrease shrub cover for lizards, potentially increasing predation. Upon restoration, some cover would be restored.

Alternatives C would have the greatest amount of treatment in Low- and Mid-elevation Shrub with 716,800 footprint-acres over a ten-year period. Additionally, Alternative C would have greatest amount of total RxFire with approximately 500,000 acres in Mid-elevation Shrub and approximately 60,000 acres in Low-elevation Shrub. Accordingly, Alternative C would have the greatest short-term impact on the Low- and Mid-elevation Shrub Guild. However, impacts to greater sage grouse would be reduced somewhat by management restrictions that limit treatments in habitats supporting sage grouse Key and Source Habitat. Alternative D would have the next greatest amount of treatment with 607,800 acres of treatment over a ten-year period. Alternative D would have much less RxFire in sagebrush habitat than Alternative C, with approximately 150,000 acres of total RxFire treatment in Mid-elevation Shrub and 120,000 acres of total RxFire treatment in Low-elevation Shrub. Additionally, Alternative D would have no WFU treatments; therefore it would have less risk to Low- and Mid-elevation Shrub Guild species than Alternative C.

Alternative B would have 295,600 footprint-acres of total treatment in a ten-year period. Accordingly it would have proportionally less short-term impacts to the Sagebrush Guild that Alternatives C and D. Alternative A would have the least short-term impacts to the Sagebrush Guild with 58,100 total footprint-acres of treatment.

In the long term, Alternatives C and D provide the greatest long-term benefits for the Sagebrush Guild. Although all alternatives provide similar percentages of early, mid- and late seral vegetation stages, Alternatives C and D provide from 17 to 41 percent of mature sagebrush at field offices across the District. In contrast, Alternative B provides 14 to 28 percent mature sagebrush and Alternative A provides from 12 to 37 percent (see Section 4.4, Analysis of the Effects on the Sagebrush Steppe Ecosystem (Issue 2) for details on seral stage proportions by field office across the District.). Additionally, long-term risk to key ecosystem components supporting this guild would be lessened under Alternatives C and D, which would result in a long-term FRCC in mid-elevation shrub of 1 and 2 respectively. In contrast, Alternative A would have an FRCC of 3 and Alternative B would have an FRCC of 2 to 3 for this cover type. Low-elevation Shrub FRCC would be 2 for all alternatives. Alternative D would provide a greater benefit to the Sagebrush Guild than Alternative C by focusing vegetation treatments at the most appropriate locations on the landscape for maximum benefit to these species.

4.5.4 Salt Desert Shrub Habitat

The horned lark is the only guild species analyzed for the Salt Desert Shrub cover type. Potential impacts to horned lark would be confined to Alternative A, which would treat 1,000 footprint-acres of Salt Desert Shrub habitat over a ten-year period. Potential short-term impacts include individual and nest mortality as the horned-lark is a ground nester. Other potential impacts include the short-term removal of ground cover providing forage such as insects, spiders and seeds. Long-term benefits would be a slight increase in early native seral stages for this cover type across the District; approximately 13 to 23 percent early seral stage native Perennial Grass versus existing conditions of 4 to 11 percent early-stage Perennial Grass and 14 percent cheatgrass and noxious weeds. It should be noted that these long-term benefits would be minimal due to the limited amount of acreage (less than 3 percent of the total Salt Desert Shrub habitat)

that would be treated. Long-term risk to key ecosystem components supporting this guild would be low with all alternatives resulting in an FRCC of 1.

4.5.5 RIPARIAN HABITAT

Species analyzed as part of the Riparian Guild include white-tailed deer, bald eagle, western yellow-billed cuckoo, northern leopard frog, boreal toad, common garter snake, and Yellowstone cutthroat trout. Alternative A would treat approximately 400 acres of riparian habitat; however, none of the action alternatives have any treatment in riparian habitat. Accordingly, fire management activities would have little to no direct impact on species inhabiting riparian habitat. However, treatment in sagebrush steppe and wooded area areas surrounding riparian habitat would potentially have indirect impacts on these species. These impacts could include the loss of riparian habitat from RxFire or wildland fire that spreads into riparian areas. Sedimentation of streams and the subsequent loss of riparian habitat quality can also occur when upland areas around riparian zones are cleared as a result of RxFire or WFU.

White-tailed deer populations in the District are associated with riparian areas but often use sagebrush steppe and wooded areas near these riparian areas. Vegetation treatments in these areas could spread to riparian areas, causing individual mortality, removing cover essential to white tail deer, and decreasing available forage. However, these treatments would also remove shrub and wooded species, opening up areas and stimulating the growth of early seral stage species such as forbs and grasses, which would provide enhanced forage for white tail deer. However, in general, short-term impacts of fire management actions would be minimal for white-tail deer populations.

Bald eagle seasonal habitat occurs throughout the District with the majority of nesting, brood-rearing, and winter habitat occupations occur near major rivers. The western yellow-billed cuckoo is presently the only species in the District proposed by the USFWS to be listed under the ESA as threatened. The present range and known habitat occupation include the South Fork of the Snake River where the associated cottonwood/Riparian cover type provides nesting and brood-rearing habitat. However, vegetation treatments would be planned and implemented to avoid impacts to these crucial bald eagle and western yellow-billed cuckoo habitats. Accordingly, none of the alternatives would adversely impact either species (see Section 2.4.3.3, Fire Management Restrictions).

Northern leopard frogs are found in all grasslands, brushlands, woodlands, and forest habitats in the District. They are associated with springs, slowly moving streams, marshes, bogs, ponds, canals, and reservoirs. The boreal toad, an Idaho state sensitive species, inhabits areas near springs, streams, meadows, and woodlands between 7,000 and 12,000 feet elevation. The common garter snake occurs throughout Idaho in many similar habitats, including grassland and wooded areas in or near water sources. Although care would be taken in treatments in and around riparian areas, these species could still be impacted by treatments in upland areas bordering riparian areas. Vegetation treatments could remove vegetation in upland areas near riparian habitat, increasing the potential for sedimentation to streams and wetland areas supporting habitat for these species. The use of chemical treatments, in particular, has the potential to impact boreal toad and leopard frogs. However, excluding vegetation treatments within the 300-foot buffer zones around riparian areas, combined with prompt rehabilitation and restoration would minimize short-term adverse impacts to these species from fire management activities (see Section 2.4.3.3, Fire Management Restrictions).

Yellowstone cutthroat trout are found in various tributaries of the Snake River in the District. Fire management activities have the potential of impacting water quality, and consequently, habitat quality in these tributaries. However, management restrictions under all alternatives would require consultation with the USFWS for any vegetation treatments that could impact the water quality of these tributaries (see Section 2.4.3.3, Fire Management Restrictions). This consultation would include appropriate mitigation and avoidance to ensure the maintenance of the water quality, and consequently, the habitat quality, of these tributaries. Accordingly, none of the alternatives are likely to have adverse impacts on Yellowstone cutthroat trout.

All alternatives would result in a long-term FRCC of 1 in this cover type, accordingly, they would all result in low risk to key ecosystem components supporting this wildlife guild.

4.5.6 JUNIPER AND MOUNTAIN SHRUB HABITATS

Wildlife species representative of the juniper and Mountain Shrub cover types include mule deer, mountain lion, ferruginous hawk, juniper titmouse, and gray flycatcher. Mountain shrub can also be very important winter habitat for Columbian sharp-tailed grouse, a species that should also be considered during site-specific fire-management project design and development.

The use of controlled burns and other vegetation management in the Juniper and Mountain Shrub cover types may result in a short-term decrease both forage and cover habitat for wildlife species (Crouch 1974; Valentine 1980). However, Juniper and Mountain Shrub cover types generally provide more forage for wildlife like mule deer after recovering from a fire. An advantage of conducting RxFire or mechanical control in the Mountain Shrub and Juniper cover types is that land managers have greater control to preserve juniper and Mountain Shrub as hiding and thermal cover habitats.

Similar to other treatment methods, indirect impacts associated with RxFire may include disturbance from increased traffic and noise from mechanical equipment, which may displace wildlife from the treatment area.

Because of the dependency of mountain lion on both white tail and mule deer populations for food, the previously described impacts to these deer populations would generally have similar impacts on mountain lion populations.

Fire management activities in juniper stands would potentially increase hawk nest mortality. Additionally, ferruginous hawks are highly sensitive to human disturbance; therefore, fire management activities involving heavy equipment or hand operated machinery would likely result in nest abandonment and/or the hawks not using areas where treatments occur for foraging. However, it should be noted that restrictions on fuels and vegetation treatment projects would be imposed in areas supporting nesting raptors. These restrictions would occur from February 1 through August 15 and would be designed to prevent adverse impacts to nesting raptors, including ferruginous hawks. Accordingly, alternative impacts would be confined to short-term losses of potential foraging habitat. Many non-game wildlife species, including small rodents and wildlife species that use juniper cover types on a transitory basis, may also be temporarily displaced. This, in turn may displace predators like ferruginous hawks that rely on these species for prey.

The juniper titmouse is a year-round resident of the pinion-juniper and pine woodlands. Fire management activities that remove dead fuel have the potential to adversely impact the juniper titmouse by removing the snags or dying timber they use for their cavity nesting. Additionally,

controlled burns would result in nest and individual mortality. Human-created noise associated with fire management activities is unlikely to adversely affect the titmouse, which is highly tolerant of human disturbance.

The gray flycatcher could be adversely impacted by fire management activities that remove juniper from sagebrush stands. Flycatchers use juniper and sagebrush for nesting and these activities could result in nest mortality or loss of nesting habitat. Fire management activities are unlikely to impact flycatcher foraging as flycatchers forage exclusively on insects and fuels management projects and removal of encroaching juniper is unlikely to have a noticeable impact on available insect forage.

Alternative C would have the greatest short-term impact on habitat for the Juniper and Mountain Shrub Guild of wildlife species with 90,400 acres (29,900 Mountain Shrub, 60,500 Juniper) of total footprint treatment-acreage in these cover types over a ten-year period (approximately 13 percent of the total available habitat). The next greatest impact would be Alternative D with 56,000 footprint-acres of treatment (26,800 Mountain Shrub, 29,200 Juniper), which is approximately 8 percent of the total available habitat. Alternative B would have similar impacts to Alternative D with 52,600 footprint-acres of treatment (22,200 acres Mountain Shrub, 30,400 acres Juniper). Alternative A would have negligible short-term adverse impacts to the Juniper/Mountain Shrub Guild with 3,600 footprint-acres of treatment (2,800 acres Mountain Shrub, 800 acres of Juniper), which is less than 1 percent of the total available habitat.

Long-term impacts of fire management activities on the Juniper/Mountain Shrub Guild of wildlife species would be beneficial in many cases with lessened long-term risk of large wildland fires. This, in turn, would decrease long-term fire-caused mortality. Additionally, fire management would help slow juniper encroachment and would increase early and mid-seral vegetation stages that provide forage for mule deer. In the long term (30 years), Alternatives C and D provide the greatest percentage of early seral vegetation stages in the Juniper cover type over the long term with percentages being 10 to 20 percent of the total plant acreage throughout the District. This compares with Alternative A and Alternative B, whose percentages range from 3 to 10 percent. Similarly, Alternatives C and D provide greater mid-seral vegetation stages with percentages ranging from 16 to 34 percent. In comparison, Alternative A and Alternative B range from 5 to 18 percent. Long-term cover for mule deer would be reduced somewhat under Alternatives C and D, as would nesting habitat for juniper titmouse and grey flycatcher. However the proportion of late seral stages of both Juniper and Mountain Shrub under these alternatives would still range from 35 to 94 percent, providing more than adequate cover and nesting habitat to support existing populations for this wildlife guild.

Long-term risk to key juniper ecosystem components supporting this guild would be lessened under Alternatives C and D, which would result in a long-term FRCC in juniper of 1 and 2 respectively. In contrast, Alternative A would have an FRCC of 3 and Alternative B would have an FRCC of 2 to 3 for this cover type. Long-term risk to Mountain Shrub ecosystem components would be greatest for Alternative A with an FRCC of 3. Alternatives D would have the next greatest long-term risk to Mountain Shrub habitat with FRCC ranging from 2 to 3. Alternatives C and B would have the least long-term risk to Mountain Shrub habitat with FRCCs 1–2 and 1–3, respectively.

4.5.7 WET/COLD CONIFER, DRY CONIFER, AND ASPEN/CONIFER HABITATS

Wildlife species representative of the Wet/Cold Conifer, Dry Conifer, and Aspen/Conifer cover types include the Rocky Mountain elk, moose, snowshoe hare, northern goshawk, three-toed woodpecker, ruffed grouse, and red-naped sapsucker.

Short-term impacts from RxFire and WFU in the Aspen/Conifer and Dry Conifer vegetation are largely dependant on the intensity and extent of the fire. Low-intensity fires in these cover types typically improve wildlife habitat both spatially and temporally by clearing underbrush and encouraging the sprouting of new vegetation. Higher-intensity fires in these cover types typically improve wildlife habitat by creating clearings and movement corridors. Many wildlife species including elk and moose have been shown to benefit from the maintenance of small clearings and regeneration of forage vegetation following fires in the Aspen/Conifer and Dry Conifer cover types (Hansen et al. 1973, Kramp et al. 1983). Similar to other treatment methods, indirect impacts associated with RxFire may include disturbance from increased traffic and noise from mechanical equipment, which may cause short-term displacement of wildlife from the treatment area.

Fire management activities can displace both snowshoe hare and ruffed grouse from Conifer and Aspen habitat. However, these activities can also remove decadent timber stands and allow the growth of grasses, forbs, and young shrubs that snowshoe hare use for forage in the spring and summer. These early seral stages also provide herbaceous cover for ruffed-grouse brood-rearing, which directly impacts areas of use and brood survival (Harju 1974, Zwickel 1972). Ruffed grouse can also benefit from the additional forage these early seral stages provide in the form of berries and seeds. However, removal of aspen and conifer stands can also deprive both species of winter forage such as tree bark, and spruce, fir and cedar needles.

Fire management activities can cause a short-term loss of nesting habitat for northern goshawks, as well as creating disturbances that would cause goshawks to seek out new habitat. However, as with the other raptors previously mentioned, restrictions on fuels and vegetation treatment projects would be imposed in areas supporting nesting raptors. Accordingly, alternative impacts would be confined to short-term losses of potential foraging habitat. Many non-game wildlife species including small rodents as well as wildlife species that use conifer or aspen cover type types on at least a transitory basis may also be temporarily displaced. This, in turn may displace predators like northern goshawk that rely on these species for prey.

Fire management activities would have a short-term adverse impact on three-toed woodpecker foraging and nesting habitat as it would remove decadent timber stands and dog-hair spruce thickets that provide potential nesting locations and habitat for wood-boring insects. However, these activities would also decrease the risk of catastrophic fires that would cause long-term loss of forested habitat. Short-term impacts to the red-naped sapsucker would be similar to those described for the three-toed woodpecker.

Alternative D would have no short-term adverse impact on Aspen/Conifer wildlife species as it would have no fire management treatments in these cover types. Alternative A would have the next least short-term adverse impact to wildlife species using the Aspen/Conifer cover types as it would treat a total footprint of 4,800 acres of these habitats (less than 3 percent of the total available habitat) over a 10-year period. Alternative C would treat a 15,800-acre footprint (9 percent of total available habitat). Alternative B would have the greatest short-term loss of habitat with a total treatment footprint of 30,700 acres (18 percent of total available habitat).

In the fire management activities under Alternatives A, C, and D would provide similar long-term impacts to Aspen and Dry Conifer habitat with each providing a relatively high percentage of late seral stages, which may include decadent aspen stands and older conifer stands with high-fuel loading. The percentages of these late seral stages under these alternatives would range from 56 to 78 percent of the total habitat. Alternative B would provide the highest percentage and the closest proportions of seral stage in relation to DFC, with late seral stages ranging from 44 to 63 percent, early seral stages ranging from 6 to 13 percent, and mid-seral stages ranging from 31 to 43 percent. Accordingly, Alternative B would have the greatest long-term benefit to Aspen/Conifer wildlife species inhabiting Aspen and Dry Conifer habitat by providing the most balanced proportion of forage and cover for these species.

Conversely, Alternative C provides the greatest positive benefit to wildlife species inhabiting Wet/Cold Conifer cover types. Alternative C provides the closest match to DFC with early seral stages ranging from 22 to 30 percent of total habitat, mid-seral stages at 17 percent, and late seral stages ranging from 53 to 71 percent. By contrast, Alternatives A, B, and D have early seral stages ranging from 0 to 7 percent, mid-seral stages ranging from 8 to 9 percent, and late seral stages ranging from 84 to 92 percent.

In terms of FRCC, Alternative B would result in moderate risk to key ecosystem components supporting this guild with a long-term FRCC of 2. Alternative A and Alternative C would result in moderate to high risk with FRCC of 2 to 3. Alternative D would result in high risk with an FRCC of 3 in this habitat type.

4.5.8 Special Status Wildlife Species

Forty-one special status animal taxa are known to occur in the District. Section 3.5.2, Special Status Wildlife Species outlines these special status species that are known to occur throughout the District and the cover types they are associated with. A list of these special status species and a life history discussion of the federally listed special status species is also included in Appendix K. A summary of potential impacts to these species is provided below in Table 4-38.

Table 4-38. Sensitive Species in the District, by Vegetation Cover Type

Vegetation Cover Type	Sensitive Species List	Potential Impacts
Low- and Mid-elevation Shrub Cover type	Type 2: Pygmy rabbit, greater sage grouse, St. Anthony Dunes tiger beetle, Idaho point-headed grasshopper. Type 3: Loggerhead shrike, Brewer's sparrow, Sage sparrow, Townsend's big-eared bat, California bighorn sheep, Piute ground squirrel. Type 4: Cliff chipmunk, Uintah chipmunk, Wyoming ground squirrel, Kit fox, Black-throated sparrow.	Impacts to sensitive species that are small mammals, birds, and big-game would be similar as those described above for similar species in the Low- and Mid-elevation Shrub Guild of Wildlife Species. All fire management treatments would likely result in positive impacts to St. Anthony Dunes tiger beetle by clearing sandy areas of cheatgrass and other invading weeds. Impacts to Idaho point-headed grasshopper would be similar to impacts described for Low- and Mid-elevation Shrub wildlife species that depend on grasses and forbs. Townsend's big-eared bat has the potential for substantial short-term disturbance impacts from all alternatives due to their low tolerance for human disturbance. Long-term impacts to Townsend's big-eared bat would be identical to those described for Low- and Mid-elevation Shrub Guild described above.

TABLE 4-38. SENSITIVE SPECIES IN THE DISTRICT, BY VEGETATION COVER TYPE

Vegetation Cover Type	Sensitive Species List	Potential Impacts
Perennial Grass	Type 3: Columbian sharp-tailed grouse.	Same as those described above for sharp-tailed grouse.
Juniper, Mountain Shrub, and Salt Desert Shrub	Type 3: California bighorn sheep, Prairie falcon, Ferruginous hawk, Piute ground squirrel. Type 4: Cliff chipmunk, Uintah chipmunk, Wyoming ground squirrel, Little pocket mouse, Virginia's warbler.	Impacts would be similar to those described above for small mammals, big game, and birds in the Juniper/Mountain Shrub and Salt Desert Shrub Guilds.
Riparian Areas	Type 1: Bald eagle, Western yellow-billed cuckoo. Type 2: Northern leopard frog, boreal toad, greater sage grouse. Type 3: Columbian sharp-tailed grouse, Calliope hummingbird, Willow flycatcher, Common garter snake, Western toad.	Impacts would be similar to those described above for the birds, amphibians, and reptiles in the Riparian Guild.
Dry Conifer, Aspen/Conifer cover types	Type 3: Fisher, Lewis woodpecker, flammulated owl, Northern goshawk, Williamson's sapsucker, Hammond's flycatcher, Olive-sided flycatcher.	Impacts would be similar to those described above for birds in the Aspen/Conifer and Dry Conifer Guild.
Wet/Cold Conifer cover types	Type 1: Gray wolf, Grizzly bear, Canada lynx. Type 3: Fisher, Northern goshawk, Williamson's sapsucker, Hammond's flycatcher, Olive-sided flycatcher.	Impacts would be similar to those described above for big game and birds in the Wet/Cold Conifer Guild. Management restrictions, which apply to all alternatives, require that all fuels management and vegetation treatments comply with the Draft Conservation Strategy for the Grizzly Bear in the Yellowstone Area, the 1997 Targhee National Forest Revised Forest Plan, and the Yellowstone Conservation Strategy. Additionally, presence or absence of Grey wolf would be determined before fuels and vegetation management projects are initiated on the District. Accordingly, impacts to gray wolf and grizzly bear populations would be minimal. Potential impacts to Canada lynx habitat would be identical to those described above for snowshoe hare because of the lynx's reliance on this prey.
Annual Grass Cover type	None.	N/A.

As stated in management common to all, the BLM is required to consult with the USFWS on potential impacts to listed plant and animal species. The USFWS also suggests the BLM consult with them informally when assessing projects that may impact candidate species. Sensitive species is a BLM classification equivalent to IDFG's species of special concern. An agreement between the BLM and IDFG makes these two lists identical. BLM sensitive species are designated by the State Director under 16 USC 1536 (a)(2). BLM policy includes a commitment

to conserve federally listed and proposed threatened or endangered species and the habitats on which they depend, and a commitment to manage other special status species so that BLM actions do not contribute to a need to list these species. The Master MOU between the IDFG and BLM states that the BLM and IDFG agree to manage and/or conserve habitats and populations of the sensitive species listed in the MOU, to minimize the need for listing these animals as threatened or endangered. Accordingly, none of the fire management activities proposed under any of the alternatives would have a significant adverse impact on TES species in the District.

4.5.9 Mitigation and Monitoring

The management restrictions listed in Chapter 2, Description of Alternatives are incorporated into management practices common to all alternatives. These practices would be implemented to avoid significant adverse impacts to wildlife resources. However, there would be short-term unmitigatable impacts to these resources. These impacts are noted below in Section 4.5.11.

4.5.10 Unavoidable Adverse Impacts

From 250,200 to 1,686,600 footprint acres of wildlife and TES species habitat would be unavailable to wildlife for the next 10-years depending on which alternative is chosen. This would result in an unavoidable loss of this habitat. However, the unavoidable adverse impact from this habitat loss would not have a significant long-term impact on wildlife or TES populations in the District if established wildlife management restrictions and recommendations are followed in the project-specific development of vegetation treatments.

4.5.11 Irretrievable and Irreversible Commitment of Resources

Irretrievable impacts to wildlife and TES species habitat would include the short-term loss of habitat as described above. However, this short-term habitat loss would not be irreversible, as it would be restored through implementation of a rehabilitation and restoration program as described in Chapter 2.

4.5.12 Cumulative Effects

Wildlife associated with the District regularly transverse lands managed by other federal and state agencies as well as private lands. To ensure the continued viability of the wildlife populations associated with the District, efforts must be made between these groups to coordinate land use directions. There are several planning efforts for these lands currently underway which may, in conjunction with this planning effort, affect the wildlife associated with the District. The cumulative effects to wildlife are considered relative to the long-term effects of Alternative B in relation to other similar plans developed or being developed by these other federal and state agencies. These plans include the Interior Columbia Basin Ecosystem Management Project, the Sawtooth and Caribou-Targhee National Forests management plans, and the Idaho Statewide Implementation Strategy for the National Fire Plan. The principal goal of these plans is to reduce the severity of wildland fires in the region. The means proposed to meet this goal is broadly similar to many actions proposed under the various alternatives in this EIS, and include RxFire, WFU, ES&R, and restoration activities.

Impacts of wildland fire to wildlife populations and their habitats in the District predominantly relate to the severity and frequency of the fire. High intensity, large fires burning frequently through the sagebrush steppe, in general, result in more negative impacts to wildlife populations and their habitats. Thus, reducing the intensity, extent, and frequency of wildland fires in the

sagebrush steppe would, over the long run, reduce impacts to wildlife resources in the District. There will be short-term impacts relating to RxFire, WFU, ES&R and restoration, or other fire management practices.

All vegetation treatments would occur in accordance with established management plans and guidelines for wildlife species associated with the habitats being treated. Cumulative impacts may vary, however, depending on each alternative; thus cumulative impacts must be examined relative to the alternatives in terms of their contribution to other plans for reducing the intensity and duration of fires.

In general, the cumulative effects on wildlife resources for each alternative action of the various fire management plans being developed would be related to the amount of acreage moving from FRCC 3 to FRCC 1. Because the general goals of the other fire management plans and regional strategies are to, in essence, reduce the amount of acreage in FRCC 3 and increase the amount in FRCC 1, these plans should have a positive long-term effect on wildlife resources by reducing wildland fire severities and frequencies. Consequently, the alternatives proposed in this EIS should also be considered in terms of their overall contribution to reducing the intensity and extent of wildland fires. Alternatives that achieve a reduction in the extent and frequency of fires would, in combination with the actions undertaken in other regional plans, have a greater positive effect than those that do not reduce, or reduce in lower amounts, the extent and frequency of wildland fires.

Of the four alternatives described in this EIS, Alternative A results in the least long-term improvement in habitat quality. Thus, Alternative A would have the least positive cumulative impact on the other plans and management strategies in the foreseeable future. Alternative B would result in the next most improved habitat quality relative to Alternative A. Relative to Alternative A, Alternative B would have a greater positive cumulative impact. Alternatives C and D both result in substantially better wildlife habitat condition than Alternative A and Alternative B. Thus, these alternatives would have an additional positive cumulative impact on wildlife populations and their habitat when considered with the other fire management plans in the region. These impacts would be greater than either Alternative A or Alternative B. It should be noted that the project would have a much greater contribution to the positive cumulative impacts of fire management on wildlife habitat in the District and surrounding area than the previously described fire management activities that are or will be implemented by other agencies.

4.6 ANALYSIS OF EFFECTS ON AIR QUALITY

4.6.1 ANALYSIS ASSUMPTIONS AND METHODS

Impacts to air quality associated with fire, fuels, and related vegetation management over a 10-year period have been assessed for each BLM field office in the District. The severity of these potential impacts under each alternative scenario is based on estimates of particulate matter emissions and their occurrences relative to sensitive receptors. PM_{10} and $PM_{2.5}$ emissions associated with RxFire or WFU were estimated by multiplying the number of acres of each cover type to be treated under each alternative by emission factors specific to each of those types. The amount and type of vegetation to be treated within a Generalized Project Areas (GPA) differs by alternative; thus, associated emission levels would also vary. Regional geographic features and meteorological patterns at an airshed scale, as described in the airshed characterization report

(Trinity 2003), were incorporated into the analysis to assess how these emissions would disperse across the District. This information, combined with known treatment area locations, predicted whether sensitive receptors would be affected, and whether NAAQS would be met under each alternative scenario. Sensitive receptors included impact zones, PM_{10} non-attainment areas, Class I visibility areas, hospitals, airports, and transportation corridors. Decreases in PM_{10} and $PM_{2.5}$ emission levels over the long term (30 years into the future) were estimated for each alternative based on the assumption that treatment would result in a decrease in wildland fire acreage proportional to the percentage of treatment relative to total existing vegetation. The following factors were considered in this assessment of smoke impacts.

4.6.1.1 Locations of Sensitive Receptors

Impact assessments must consider where communities and other sensitive facilities lie with respect to emission sources and regional airflow. Smoke impacts to human health and safety are intensified near hospitals/medical centers. Visibility may be impaired near Class I areas, airports, and transportation corridors.

4.6.1.2 Generalized Project Areas (GPA)

Treatment-acres were assigned to GPAs by alternative for planning purposes. Identifying treatment-acreage within these spatial boundaries allows for a more site-specific impact analysis that takes into account meteorological patterns and proximity of sensitive receptors.

4.6.1.3 Dispersion Characteristics

Regional wind patterns greatly influence air quality. Generally, wind across the District prevails from the southwest to the northeast. Winds are strongest in the summer, with April and July recording the highest wind speeds. With changes in seasons and localized conditions wind direction can vary. Wind patterns and local mixing heights primarily determine whether air particulates disperse throughout the airshed or settle and concentrate in a valley.

4.6.1.4 Geography

Local topographic features influence smoke dispersion characteristics. For example, canyon gradients often produce diurnal wind fluctuations corresponding to warm and cold air exchange. Low-lying floodplains act as sinks for cold air, where it settles and may become stagnant. At a larger, landscape-scale, mountain ranges surrounding a valley may hinder air movement and contribute to the formation of inversions. Mountain barriers may also restrict airflow to a single direction out of a valley.

4.6.1.5 Mixing Heights

Smoke may concentrate at low elevations in the cooler hours of the day, before temperatures increase and heated air rises. Lower elevations and cooling temperatures (especially at night) result in lower mixing heights (below 1,640 feet), which can produce stagnate air conditions. Timing burns to avoid low mixing heights or inversions is crucial near population centers.

4.6.1.6 Additional Sources of Particulate Matter (PM_{10} and $PM_{2.5}$)

Smoke produced by fire and fuels management activities would combine with existing emissions from other sources. Some areas within the District already experience high emissions concentrations from fugitive dust, wood and waste burning, and agricultural/forestry activities

(EPA 2003). Also, particulates produced from wildland fires in areas not burned under a controlled management scenario would still occur in the absence of the proposed project. It is assumed that, by maintaining cover types in FRCC 1, less smoke would be produced.

4.6.2 EFFECTS COMMON TO ALL ALTERNATIVES

4.6.2.1 Treatments

RxFire and WFU: Management-ignited fires and WFU under controlled conditions decrease fuel loads at specific times over pre-determined areas, thus reducing both instantaneous and long-term air quality impacts. Values would not necessarily be less than what would occur when these areas eventually burn naturally (e.g., wildland fire events without control), but under controlled conditions smoke is produced in smaller amounts over a longer time period, thereby; lessening fire intensity and instantaneous smoke production, and increasing the effectiveness of smoke dispersal. Controlling the time and duration of a burn also considers existing particulate levels. If PM_{10} and $PM_{2.5}$ concentrations are already high, burns would be postponed.

Chemical: Aerial applications of herbicides in the vicinity of sensitive receptors would pose a public health and safety risk. Chemical activities are subject to strict guidelines designed to reduce these impacts by considering the timing and location of applications.

Mechanical: Fugitive dust would be produced by ground-disturbing vegetation treatments such as mowing and chaining. Mechanical treatments provide an alternative method to reduce fuel loads in areas where fire risk is too great to employ RxFire or WFU. Impacts from dust would be less than what would occur if these areas burned naturally.

Seeding: Drilling and aerial applications of seed would not impact air quality. However, some ground disturbance occurs with seeding activities such as chaining, which helps bury the seed. PM_{10} levels could increase due to entrained dust.

4.6.2.2 Sensitive Receptors by Airshed

Impacts to sensitive receptors could occur throughout the District depending on their locations relative to sources of smoke. Sensitive receptors are listed here by airshed, with reference to the field office in closest proximity.

Airsheds 17, 18, and 19 (IFFO and a small portion of PFO): Teton Valley Hospital and Surgicenter, Northwestern Band of Shoshone Health Center, Pocatello Regional Medical Center, Portneuf Medical Center, Bingham Memorial Hospital, State Hospital South, Eastern Idaho Regional Medical Center, Lost Rivers District Hospital, Madison Memorial Hospital, and Harms Memorial Hospital.

Transportation facilities include: Pocatello Regional Airport, Aberdeen Municipal Airport, McCarley Field, Fanning Field, Arco-Butte County Airport, Stanford Field, Rigby-Jefferson County Airport, Rexburg-Madison County Airport, American Falls Airport, Pocatello Regional Airport, and Dubois and Driggs Municipal airports. Transportation corridors include: I-15, I-86, I-84, US 30, US 39, US 26, US 20, US 91, and US 93.

Airshed 25 (BFO and SFO): Cassia Regional Medical Center, Gooding County Memorial Hospital, Hagerman (3 hospitals), St. Benedict's Family Medical Center, Rupert (1 hospital), Magic Valley Regional Medical Center, Twin Falls Clinic and Hospital, and Twin Falls (1 hospital).

Sensitive transportation-related facilities include: Carey Airfield, Burley Municipal Airport, Oakley Municipal Airport, Gooding Municipal Airport, Hazelton Municipal, Jerome County Airport, Buhl Municipal, Joslin Field, I-84, I-86, US 30, US 93, US 20, US 25, US 26, and US 74.

Airshed 20 (PFO): Bear Lake Regional Hospital, Caribou Memorial Hospital and Living Center, Franklin County Medical Center, and Oneida County Hospital. These health facilities are concentrated in the southeast corner of the field office.

Transportation-related facilities include: Hyde Memorial Airport, Bear Lake County Airport, Allen H. Tigert Airport, Bancroft Municipal Airport, Preston Airport, Malad Airport, I-15, I-91, I-84, I-80, US 40, US 30, US 89, US 34, and US 91.

Airshed 24 (SFO): Wood River Medical Center, Bellevue, and Sun Valley (hospitals). Transportation-related receptors include: I-84, US 20, US 93, Friedman Memorial Airport, and Camas County Airport.

4.6.2.3 Fire Regime Condition Class (FRCC)

Particulate estimates reported by alternative are those associated with the controlled restoration of areas in FRCC 2 and 3 to FRCC 1. Cover types were assigned to a FRCC based on departure from the historical fire regime and existing vegetation composition and structure. Smoke production, measured as PM_{10} and $PM_{2.5}$ concentrations, varies among FRCC depending on the degree of departure from fire frequency and severity. It is assumed that areas classified as FRCC 2 or 3 would eventually burn naturally, but that these areas, characterized by high fine and/or woody fuel loads and vegetation that is greatly altered from historical composition and structure, would burn more intensely and/or severely. Under this scenario, smoke is produced in large volumes and does not disperse efficiently.

Smoke production is one of five key ecosystem attributes in the descriptions of each FRCC, and it is assumed that returning areas to FRCC 1 would decrease the chance of severe smoke impacts in the future. The relation between each FRCC and smoke production is described further in Section 3.6, Air Quality.

4.6.3 ALTERNATIVE A

4.6.3.1 Direct and Indirect Impacts

Table 4-39 shows estimated 10-year emissions associated with the fire, fuels, and related vegetation management objectives of Alternative A. Values reflect emissions that occur under existing management practices. They do not include additional emissions from naturally occurring wildland fire events. WFU is not currently a management tool in the District. Therefore, smoke production under Alternative A is attributed to RxFire practices. The majority of these RxFires occur within the Low-elevation Shrub, Annual Grass, and Mid-elevation Shrub cover types, with some also in the Perennial Grass and Dry Conifer. (Zero values indicate field offices that do not currently incorporate RxFire management practices.)

TABLE 4-39. PARTICULATE MATTER (TONS) RESULTING FROM RXFIRE OVER 10 YEARS – ALTERNATIVE A

Field Office	PM_{10}	$PM_{2.5}$
Idaho Falls	545	453
Pocatello	797	678
Shoshone	0	0
Burley	121	102
Total	**1,463**	**1,233**

4.6.3.2 Contribution by Field Office

The majority of burn treatments would occur in the PFO and IFFO under this alternative, resulting in more particulate emissions here than in the other areas of the District. Estimates of total PM_{10} and $PM_{2.5}$ emissions from non-project related sources over a 10-year period for this area range from 14,420 to 256,100 tons and 3,030 to 45,680 tons, respectively (based on annual average from 1995-1999 [Trinity 2003]).

Small amounts of PM_{10} and $PM_{2.5}$ emissions from RxFire would also generate from the BFO. Estimates of total PM_{10} and $PM_{2.5}$ emissions from non-project related sources over a 10-year period for this area range from 36,670 to 255,640 tons and 6,620 to 52,980 tons, respectively (based on an annual average from 1995-1999 [Trinity 2003]).

Overall, these contributions from RxFire to other particulate sources under Alternative A would not substantially change existing air quality in this area.

4.6.3.3 Affected Airsheds

Under Alternative A, smoke-producing activities would affect portions of Airsheds 17, 18, 19, 20, and 25 (see Figure 3-8). These airsheds connect over the low-lying Snake River Plain. Seasonal fluctuations in general wind patterns coincide with the orientation of this river valley, which traverses the IFFO and BFO, and lies on the northwest border of the PFO. Airshed 18 lies high in the northeast corner of the District, bounded by the Centennial Mountains and Yellowstone National Park, whereas Airshed 19 consists primarily of the low-elevation Snake River Plain. The small portion of airshed 17 included in this discussion is the mountainous region of the Lemhi and Lost River ranges.

Smoke produced in Airshed 25, which is bounded by hills to the north and east, will disperse towards Airsheds 19 and 18 in the summer and spring, as winds blow to the northeast. This pattern will reverse in the fall, and may blow smoke from activities in Airsheds 18 and 19. However, as winds change direction in the fall and blow towards the southwest they are typically not as strong. Depending on the season and associated wind patterns, particulates from activities in the higher-elevational areas may blow into and settle in the Snake River Plain during the fall, potentially increasing effects to air quality such as impacts from particulate matter and haze.

Of the RxFire activities under Alternative A, the majority would occur in GPAs located in Airsheds 18, 19, and 20 (i.e., Sands, Medicine Lodge, Island Park, Blackfoot, Stump Creek, Bancroft GPAs). Potential adverse air quality impacts could occur to the sensitive receptors in

the Idaho Falls area of Airshed 19. Prevailing winds from the northeast in the fall could blow smoke south towards the impact zone surrounding Idaho Falls, and the community of Rexburg. Effects could include inversions, increased haze, and decreased air quality. However, particulates are relatively low under Alternative A; therefore, impacts would be less than with other alternatives.

Airshed 19 contains 15 PM_{10} ambient air quality monitors. The NAAQS 24-hour average limit (150 µg/m3) has been exceeded three times in Pocatello, which lies on the boundary of Airsheds 19 and 20 (Trinity 2003). Airshed 20 has three PM_{10} ambient air quality monitors (Inkom and Soda Springs). However, NAAQS 24-hour average limits have not been exceeded in Airshed 20.

Additional particulate emissions could increase the potential to exceed NAAQS standards. Sources to consider originate from agriculture/forestry activities, which currently contribute 11 percent of the PM_{10} and 10 percent of the $PM_{2.5}$ emissions in Bannock County where Pocatello is located. Analysis of adjacent Power County emission sources attributes 41 percent of PM_{10} and 22 percent of $PM_{2.5}$ to agriculture/forestry activities. Particulate levels from these other sources would be considered prior to planning treatment activities in the Pocatello or adjacent GPAs.

The two federally designated PM_{10} non-attainment areas of the District are located in Airsheds 19 and 20; Portneuf Valley and Fort Hall Reservation. Two other federally designated PM_{10} non-attainment areas, Boise, Idaho, and Ogden, Utah, are within the 100-km buffer zone surrounding the District. These areas would not likely experience adverse air quality impacts, as particulate emissions from Alternative A are relatively low, and are not planned in the immediate proximity or are generally upwind from potential treatment areas.

Also within the 100-km buffer zone is the Class I visibility areas of Yellowstone and Grand Teton National Parks, and the Bridger Wilderness. Smoke carried to the northeast by strong winds during the spring and summer, in particular smoke from activities in Airshed 18, could travel to nearby Yellowstone National Park. However, as emissions associated with Alternative A are relatively low, smoke would likely disperse and would not result in adverse air quality impacts to this or other FRCC 1 and sensitive areas within the 100-km buffer zone.

Burning in close proximity to sensitive receptors and impact zones would increase the potential for adverse impacts to air quality. However, emission totals from Alternative A are relatively low. The impact zones of Twin Falls, Idaho Falls, and Portneuf area not likely to be affected under Alternative A. Burning activities close to these population centers could affect air quality if wind carries smoke directly into cities or if particulates are trapped in the Snake River Valley by inversions. However, because of the relatively low amounts of emissions produced under Alternative A, impacts would be minimal and could be further alleviated by carefully planning timing and season of burn activities scheduled to occur in close proximity to these sensitive areas.

Overall, adverse air quality impacts associated with Alternative A would be minimal. Some negative impacts could occur if burning activities are located within close proximity of sensitive receptors (e.g., Idaho Falls, Rexburg, Craters of the Moon National Monument and Preserve); however, effects could be avoided with careful planning. Emissions are projected to be low and would likely disperse prior to reaching these areas of concern. No impacts would be expected to Class I visibility areas and areas within the 100-km buffer zone.

While fewer direct air quality impacts would occur under Alternative A due to the limited amount of planned vegetation management activities, adverse indirect air quality impacts over the long term would occur. The absence of management aimed at returning vegetation to FRCC 1 would increase the risk of large and/or severe fires in areas now designated FRCC 3 or 2. Fires of this scale are unpredictable, often producing large quantities of smoke over large areas of land at times when ambient air quality is already poor. High, instantaneous volumes of smoke may settle and concentrate, or be blown into sensitive areas, producing adverse impacts to human health and safety.

Limited fire-related fuels management would continue under this alternative, producing the least amount of particulate emissions as compared to Alternative B or other alternatives. However, Alternative A would result in a higher level of emissions from unplanned wildland fires. Based on existing wildland fire data for the last 32 years, it is estimated that approximately 767,474 acres of unplanned wildland fire would occur in the District over the next 10 years. Assuming this wildland fire would burn cover types in proportion to their abundance, this would produce approximately 153,495 tons of PM_{10} and 130,471 tons of $PM_{2.5}$ under Alternative A over the next 10 years.

Under Alternative A, FRCC of the primary cover types of the District proposed for treatment are predicted to be as follows. Low-elevation Shrub, Perennial, and Annual Grass, and Aspen/Dry Conifer would be FRCC 2-3. Mid-elevation Shrub and Juniper, and Mountain Shrub would remain FRCC 3. It is predicted that this remaining area would be highly susceptible to severe wildland fire.

4.6.4 ALTERNATIVE B

4.6.4.1 Direct and Indirect Impacts

Table 4-40 shows estimated emissions over a 10-year period associated with the fire, fuels, and related vegetation management activities of Alternative B. Values include emissions from WFU and RxFire management activities only. Treatments are focused on the Annual Grass, Low-elevation Shrub, Mid-elevation Shrub, Perennial Grass, Dry Conifer, Aspen/Conifer, and Mountain Shrub cover types.

TABLE 4-40. PARTICULATE MATTER (TONS) RESULTING FROM WILDLAND FIRE USE (WFU) AND RXFIRE OVER 10 YEARS – ALTERNATIVE B

Field Office	PM_{10}	$PM_{2.5}$
Idaho Falls	8,004	6,767
Pocatello	7,642	6,485
Shoshone	3,379	2,785
Burley	1,210	1,017
Total	**20,235**	**17,054**

4.6.4.2 Contribution by Field Office

The majority of particulate emissions under this alternative would originate from fire activities within the IFFO and PFO, which compose the eastern side of the District. With Alternative B, total PM_{10} and $PM_{2.5}$ emissions would increase 14 times over Alternative A (existing fire management scenario). However, it is assumed that these increases would be offset by decreases in PM_{10} and $PM_{2.5}$ emissions that would result from the associated reduction in wildland fire. Over the 10-year period, wildland fire could potentially occur on the remaining acreage in the District that is not proposed for treatment, causing additional impacts to air quality (see further discussion below).

Existing PM_{10} and $PM_{2.5}$ emissions from all other sources in the IFFO range from 14,420 to 256,100 tons and 3,030 to 45,680 tons, respectively, over a 10-year period. In the PFO, PM_{10} and $PM_{2.5}$ emissions over 10 years range from 45,230 to 256,100 tons and 8,730 to 45,680 tons, respectively (based on the annual average from 1995-1999 [Trinity 2003]).

To a lesser degree, PM_{10} and $PM_{2.5}$ emissions would also increase in the SFO and BFO. Although less in absolute numbers, emissions from fuels management activities proposed in these field offices would substantially increase compared to Alternative A.

Existing 10-year totals of PM_{10} and $PM_{2.5}$ emissions from other sources in the BFO and the southern half of the SFO range from 36,670 to 255,640 tons and 6,620 to 52,980 tons, respectively. Estimates of total PM_{10} and $PM_{2.5}$ over a 10-year period range from 32,919 to 89,280 tons and 6,000 to 40,410 tons, respectively for the northern half of the SFO (based on the annual average from 1995-1999 [Trinity 2003]).

4.6.4.3 Affected Airsheds

Alternative B would affect all airsheds within the District. Particulate sources would be concentrated in Airsheds 18, 19, 20, and some of 17. Activities would also occur in Airsheds 24 and 25, which would also contribute to total emissions of this alternative.

During periods of stagnant air, particulates that settle in the low-lying Snake River Plain would concentrate and adversely impact air quality. Stream valleys and other topographic features of Airshed 20 drain towards the Snake River, creating elevational gradients that funnel winds northward into the Snake River Plain. These topographic features combined with characteristic northeast-trending winds across the District in the spring and summer would carry smoke from activities in Airshed 20 towards Airsheds 17, 18, and 19, and across the stateline into Wyoming. These seasonal winds could also blow smoke produced in Airshed 25 towards Airshed 19.

Mountains and hills on the northern and southern sides of Airshed 24 limit the horizontal smoke dispersion potential. Mixing heights must exceed these terrain features for successful dispersion; otherwise inversions may occur in this airshed, which includes the Ketchum urban impact zone. Treatments are proposed in nearby fire management zones of Fish Creek, Little Wood, and Sun Valley, which could directly impact the Ketchum urban impact zone.

Smoke that settles in the centrally located Snake River Plain may affect impact zones and other sensitive receptors in cover types along the I-15 corridor. Idaho Falls and Portneuf, two impact zones centrally located between Airsheds 19 and 20, and the town of Rexburg could be impacted by the increases in smoke associated with Alternative B. The Portneuf Valley (Airshed 20) and

Fort Hall Indian Reservation (Airshed 19) are non-attainment (PM_{10}) areas in this vicinity as well.

Smoke originating from the Sands and Teton Basin GPAs could impact sensitive receptors in Idaho Falls in the fall, as winds blow from the northeast. Smoke from fire treatments within Airshed 18 (Island Park, Medicine Lodge GPAs) could also blow towards Idaho Falls and Rexburg in the fall.

Fires in the Pocatello GPA would affect sensitive receptors in the Portneuf urban impact zone. Pocatello could also experience indirect effects from smoke originating from Sands and Teton Basin GPAs in the fall. Smoke originating from the Deep Creek/Pleasantview, Curlew, and Lava/Downey GPAs could adversely impact air quality in Pocatello in the spring and summer. These areas would likely experience increases in particulates.

Although treatments are not concentrated in GPAs adjacent to Twin Falls (impact zone in Airshed 25), adverse air quality impacts could still occur in the form of increased haze, as winds carry particulates from the northeast. The Craters of the Moon National Monument and Preserve could also experience adverse air quality impacts in the fall from fires originating in the Big Lost and Little Lost fire management zones. In general, adverse impacts would include reduced visibility from haze and decreases in air quality.

Few treatments would occur under Alternative B that could potentially affect visibility in the Class I area of Craters of the Moon National Monument and Preserve during the spring and summer. Haze accumulations could occur due to burning activities in Airsheds 18 and 19 in the fall. These particulates could also travel further into the Ketchum urban impact zone.

Airshed 19 contains 15 PM_{10} ambient air quality monitors. The NAAQS 24-hour average limit (150 µg/m3) has been exceeded three times in Pocatello (Trinity 2003). Additional particulate emissions in this area would contribute to exceedences of NAAQS. Additional contributing sources originate from agriculture/forestry activities, which currently contribute 11 percent of the PM_{10} and 10 percent of the $PM_{2.5}$ emissions in Bannock County where Pocatello is located. Adjacent Power County attributes 41 percent of PM_{10} and 22 percent of $PM_{2.5}$ to agriculture/forestry activities. Particulate levels from these other sources would be considered prior to planning treatment activities near the Pocatello or adjacent GPAs.

Data from three ambient air quality monitors located within Airshed 20 show 24-hr PM_{10} average levels are below the NAAQS limit of 150 µg/m3. However, Pocatello is adjacent to this airshed and has exceeded the 24-hr PM_{10} average in the past. Additional smoke in this area would contribute to adverse air quality impacts. There are no federally designated PM_{10} non-attainment areas in Airshed 24 or 25. Data from one ambient air quality monitor, located in Ketchum (airshed 24), shows 24-hr PM_{10} average levels are below the NAAQS limit of 150 µg/m3. No exceedence has occurred between 1997 and 2002.

Within the 100-km buffer zone, federally mandated Class I visibility areas include Yellowstone and Grand Teton National Parks, and the Bridger and Sawtooth Wilderness areas. Impacts to these areas could occur in the spring and summer due to the prevailing wind patterns, evidenced primarily as haze accumulations. Other sensitive areas within the 100-km buffer zone include Boise, Idaho, and population centers along the Wasatch Front in Utah. Smoke produced in Airsheds 24 and 25 would likely disperse, and therefore not adversely affect air quality in Boise, Idaho. However, the large volumes of smoke produced in Airshed 20 would potentially carry to

the south and may accumulate as haze in areas such as Cache, Box Elder, and Davis Counties, Utah. Adverse air quality impacts to these sensitive areas could result.

Overall, the additional particulates associated with Alternative B are not likely to adversely change existing air quality. The larger amounts of particulates produced in Airsheds 17,18,19, and 20 have a greater potential to adversely impact air quality during burning periods than do volumes produced in Airsheds 24 and 25. Site-specific impacts could occur across the District if burning is allowed in close proximity to sensitive receptors/impact zones. Large volumes of smoke could travel to low-lying areas or be trapped in terrain-restricted valleys, such as in Airshed 24, resulting in haze and decreases in air quality.

Reducing fuel loads and restoring areas to historical fire regimes would improve air quality in the future. Eventually returning vegetation to FRCC 1 would reduce the chance of large and/or severe wildland fires; thus, air quality impacts from large, instantaneous volumes of smoke would be avoided. Based on predicted percentages of treatment, changes in FRCC under Alternative B would reduce potential wildland fire to 330,473 acres. Assuming cover types are burned in proportion to their areal coverage, this would produce an estimated 66,095 tons of PM_{10} and 56,180 tons of $PM_{2.5}$, approximately 43 percent less than Alternative A.

Under Alternative B, FRCC of the primary cover types of the District would be as follows. Low-elevation Shrub, Perennial, and Annual Grass, Mid-elevation Shrub and Juniper, and Aspen/Dry Conifer would be FRCC 2-3. Mountain Shrub would become FRCC 1-2. It is predicted that the areas not moved to FRCC 1 or 2 would be highly susceptible to severe wildland fire.

4.6.5 ALTERNATIVE C

4.6.5.1 Direct and Indirect Impacts

Table 4-41 shows estimated emissions associated with the fire, fuels, and related vegetation management objectives of Alternative C. The Mid-elevation Shrub, Perennial Grass, and Mountain Shrub cover types would receive the greatest amount of RxFire and WFU under this alternative. Low-elevation Shrub, Annual Grass, and Juniper would also receive substantial treatment by RxFire and WFU.

TABLE 4-41. PARTICULATE MATTER (TONS) RESULTING FROM WILDLAND FIRE USE (WFU) AND RXFIRE OVER 10 YEARS – ALTERNATIVE C

Field Office	PM_{10}	$PM_{2.5}$
Idaho Falls	3,284	2,694
Pocatello	9,122	7,686
Shoshone	5,025	4,082
Burley	8,741	7,335
Total	**26,172**	**21,797**

Alternative C represents the most aggressive management to return areas to FRCC 1, and as such, would produce the highest particulate emissions of all fire management alternatives. Total PM_{10} and $PM_{2.5}$ emissions resulting from fire management activities would increase by 18 times

over Alternative A. It is important to note that values are emissions from WFU and RxFire activities under controlled conditions and do not reflect the difference between these values and what would occur solely by wildland fire events. It is assumed that smoke production of at least similar magnitude would occur if these areas were left to burn naturally, but timing, location, and size of fire events would be unpredictable, and impacts to air quality from existing unmanaged fires would likely be greater than those resulting from managed events (see further discussion below).

4.6.5.2 Contribution by Field Office

The highest particulate increases would occur from activities in the PFO and BFO. Impacts to air quality from fire-related management activities would be expected. Particulate emissions in the IFFO and SFO would be similar to those described for Alternative B. However, the potential for adverse impacts across the District overall would be greater due to the higher amounts of particulates originating from the BFO and PFO.

4.6.5.3 Affected Airsheds

All airsheds of the District would be affected under this alternative. Air quality in the vicinity of sensitive receptors would likely experience instantaneous adverse impacts. Prevailing winds from the southwest in the spring and summer would likely result in short-term air quality impacts to Airsheds 24, the northern half of 25, 17, 18, and 19. These seasonal winds would blow smoke towards the low-lying Snake River Plain, producing morning inversions. Sensitive receptors in the Portneuf urban impact zone would likely experience short-term spikes in pollution during burn spring/summer events that originate in Pocatello, Curlew, Deep Creek/Pleasantview, Lava/Downey, Conner, Cotterel, Samaria, and Goose Creek GPAs. Pocatello would be affected by activities planned for the fall in Blackfoot River and Bancroft GPAs.

Idaho Falls would be affected by spring/ summer treatments originating in the Blackfoot River, Pocatello, and Bancroft GPAs. Sensitive receptors along the Interstate 15 corridor would also be affected. Periods of haze and reduced air quality would result. As winds shift in the fall, Idaho Falls impact zone and sensitive receptors would be affected by burn activities originating in the Sands GPA.

The Ketchum urban impact zone would experience adverse air quality impacts and impaired visibility from burn treatments originating in the Sun Valley GPA.

The Craters of the Moon National Monument and Preserve would potentially experience increased haze from fires originating in the Big Lost GPA in the fall.

A concentrated area of treatments occurs south of Burley and Twin Falls (impact zone) in Cotterel, Conner, City of Rocks, Middle Mountain, Goose Creek, South Hills, and Shoshone Basin/ Backwaters GPAs. Sensitive receptors in local communities would experience adverse air quality impacts in the spring and summer, as prevailing winds blow smoke to the northeast. Particulates may settle in the Snake River Valley. Smoke originating from this localized concentration of treatments could also affect areas within the 100-km buffer zone to the south.

Sensitive areas within the 100-km buffer would be affected by the high amounts of smoke generated under this alternative. Visibility could be impacted in population centers of Cache Valley and along the Wasatch front in Utah.

Direct and indirect impacts to air quality from smoke would be greatly reduced in the long term. Based on percentage of treatment, changes in FRCC would reduce area remaining susceptible to wildland fire to 160,026 acres. This would result in estimated wildland fire emissions of PM_{10} totaling 32,005 tons and $PM_{2.5}$ totaling 27,204 tons, approximately 21 percent less than Alternative A.

Under Alternative C, FRCC of the primary cover types of the District would be as follows. Low-elevation Shrub, Perennial, and Annual Grass would be FRCC 2, Mid-elevation Shrub and Juniper, and Mountain Shrub would be FRCC 1, and Aspen/Dry Conifer would become FRCC 1 - 2. It is predicted that the areas not moved to FRCC 1 or 2 would be more susceptible to severe wildland fire. The risk of severe wildland fire would be substantially reduced in the future under this alternative.

Reducing fuel loads and restoring areas to historical fire regimes would decrease future air quality impacts. Eventually returning vegetation to FRCC 1 would reduce the chance of large and/or severe fires; thus, air quality impacts from large volumes of smoke would be avoided.

4.6.6 ALTERNATIVE D

4.6.6.1 Direct and Indirect Impacts

Table 4-42 shows estimated emissions associated with the fire, fuels, and related vegetation management objectives of Alternative D. Low- and Mid-elevation Shrub cover types would receive the greatest amount of RxFire treatments, with treatments also occurring in the Juniper and Mountain Shrub cover types.

TABLE 4-42. PARTICULATE MATTER (TONS) RESULTING FROM WILDLAND FIRE USE (WFU) AND RXFIRE OVER 10 YEARS – ALTERNATIVE D

Field Office	PM_{10}	$PM_{2.5}$
Idaho Falls	2,540	2,082
Pocatello	1,625	1,373
Shoshone	1,905	1,517
Burley	2,982	2,496
Total	**9,052**	**7,468**

Relative to Alternative A, total PM_{10} and $PM_{2.5}$ would increase 6 times. It is important to note that values are emissions from RxFire activities under controlled conditions and do not reflect the difference between these values and emissions that would occur with wildland fire events. It is assumed that smoke production of at least similar magnitude would occur in the absence of the proposed management activities, as susceptible areas would eventually burn naturally. However, timing and size of wildland fire events would be unpredictable, resulting in potentially greater impacts (see further discussion below).

4.6.6.2 Contribution by Field Office

Contributions of PM_{10} and $PM_{2.5}$ emissions would be relatively even amongst the IFFO, SFO, and BFO. The PFO has less acreage in sagebrush steppe, resulting in less area to be treated and, therefore, less particulates emitted.

4.6.6.3 Affected Airsheds

Isolated areas in all airsheds in the District would experience instantaneous increases in particulates under Alternative D, but levels would be less than what would occur under the other action alternatives. In general, summer high winds would disperse smoke northward, reducing the potential of localized, adverse air quality impacts. As winds shift and slow in the fall, particulates could settle in low-lying areas such as the Snake River Plain.

Direct impacts to sensitive receptors could occur in Pocatello during spring/ summer burning in the Deep Creek/Pleasantview GPA.

Particulates would increase in the Idaho Falls impact zone from fires originating in Teton Basin, Sands, and Island Park GPAs during the fall.

Fires originating in Walcott and Wildhorse West GPAs could increase haze in the Snake River Plain in the spring and summer as winds blow smoke to the northeast. Air quality and visibility in Pocatello and along the interstate corridor could be affected.

Collectively, smoke from North Bliss, North Rim, and North Shoshone GPAs could affect air quality in and around Shoshone if burns occur in the spring and summer.

Fires proposed in Big Lost and Little Lost GPAs could affect visibility in the Craters of the Moon National Monument and Preserve Class I Area if burns occur in the fall.

Direct and indirect impacts to air quality from smoke would be greatly reduced in the long term. Based on predicted treatment-acreage, changes in FRCC would reduce wildland fire to 171,446 acres. This would reduce wildland fire emissions of PM_{10} to 34,289 tons and $PM_{2.5}$ to 29,146 tons, approximately 22 percent less than Alternative A.

Under Alternative D, FRCC of the primary cover types of the District would be as follows. Low-elevation Shrub, Perennial, and Annual Grass, and Mid-elevation Shrub and Juniper would be FRCC 2, Mountain Shrub would be FRCC 1 to 3, and Aspen/Dry Conifer would remain FRCC 3. It is predicted that the areas not moved to FRCC 1 or 2 would be more susceptible to severe wildland fire.

Reducing fuel loads and restoring areas to historical fire regimes would decrease air quality impacts in the long term. Eventually returning vegetation to FRCC 1 would reduce the chance of severe fire events; thus, air quality impacts from large volumes of smoke would be avoided.

Tables 4-43 and 4-44 summarize PM_{10} and $PM_{2.5}$ emissions, respectively, by alternative.

TABLE 4-43. PM_{10} EMISSIONS BY SOURCE FOR EACH ALTERNATIVE OVER 10 YEARS

Alternative	WFU	RxFire	Wildland fire[1]	Total
Alternative A	0	1,463	153,495	154,958
Alternative B	4,579	15,656	66,095	86,330
Alternative C	3,818	22,354	32,005	58,177
Alternative D	2,213	6,839	34,289	43,341

[1] Wildland fire acreage was predicted based on the percentage of treatment over a 10-year period in relation to total vegetation acreage. Emission factors per acre of vegetation was averaged from the emission factors for all cover types across the District.

TABLE 4-44. $PM_{2.5}$ EMISSIONS BY SOURCE FOR EACH ALTERNATIVE OVER 10 YEARS

Alternative	WFU	RxFire	Wildland fire[1]	Total
Alternative A	0	1,233	130,471	131,604
Alternative B	3,858	13,166	56,180	73,204
Alternative C	3,190	18,607	27,204	49,001
Alternative D	1,873	5,595	29,146	36,614

[1] Wildland fire acreage was predicted based on the percentage of treatment over a 10-year period in relation to total vegetation acreage. Emission factors per acre of vegetation was averaged from the emission factors for all cover types across the District.

4.6.7 MITIGATION AND MONITORING

Management restrictions and air quality restrictions common to all alternatives would be incorporated into management practices (see Chapter 2, Description of Alternatives). These guidelines would be implemented to avoid adverse impacts to air quality. All fire activities on BLM-administered land would be done in coordination with the Montana/Idaho Airshed Joint Smoke Management Program. WFU and RxFire would be restricted when regional or local air quality is compromised, or if the project would negatively affect visual quality at Craters of the Moon National Monument and Preserve or any of the Class I areas within the 100-km buffer zone surrounding the District.

Ambient air quality monitoring using existing measuring instruments would continue. Particulate emissions in areas known to have exceeded NAAQS in the past, such as Pocatello and Fort Hall Indian Reservation would be checked prior to commencement of burns. If existing ambient air quality standards would be exceeded due to vegetation treatments, the burning activity would be postponed.

In addition, careful planning of controlled fire management activities would greatly reduce the severity of air quality impacts. Planning burn times to coincide with favorable seasonal wind patterns, mixing heights, and time of day would alleviate the potential for adverse air quality impacts. Also, burning in close proximity to any known sensitive receptors/impact zones would be avoided to reduce the potential for direct impacts to these areas. Planning the size of burns in order to reduce smoke volumes would reduce the potential for smoke concentrations to reach

sensitive receptors both inside and outside of the District, and reduce impacts to visibility from haze.

4.6.8 Unavoidable Adverse Impacts

Increasing particulate concentrations in the airsheds within the District would unavoidably decrease air quality. Unavoidable impacts would primarily occur as haze accumulations and a general decrease in air quality. However, implementing management practices that would produce smoke at less and more controlled levels, and do so at times when existing air conditions are favorable, would result in fewer air quality impacts than those which would occur under the existing landscape pattern of FRCCs. Whether through wildland fire or controlled burn events, air pollution results from fire. However, if areas eventually return to a natural fire regime, future fires would produce less instantaneous and total particulate emissions. The overall future benefit to ecosystem health would offset the potential effects of fire management activities.

4.6.9 Irretrievable and Irreversible Commitment of Resources

Localized irretrievable impacts to air quality would occur on a short-term basis due to implementation of WFU and RxFire treatments. However, these impacts would not be significant due to the management restrictions described in Chapter 2. Additionally, they would be offset by the long-term benefits to air quality from reduced wildland fire risk. There would be no irreversible impacts to air quality.

4.6.10 Cumulative Effects

The spatial scale for cumulative impacts includes the District and immediately adjacent areas. For this analysis, past, present, and reasonably foreseeable future actions include fire management activities only. Other actions primarily consist of the following fire and land management plans.

DOE-ID is preparing a management plan for the SSER and recently (April 2003) DOE-ID completed the Final Idaho National Engineering and Environmental Laboratory Wildland Fire Management Environmental Assessment. Decisions arising from these planning efforts would be consistent with actions proposed in this EIS.

The Sawtooth National Forest Plan revision includes the designation of acres of land that would be treated with fire to reach forest management objectives. Depending on the amount of NFS land decided upon for treatment, additional smoke produced from projects related to these objectives could result in cumulative air quality impacts in conjunction with the action alternatives. However, the decrease in fuels and improved health of the ecosystem over the long term would be consistent with goals of Alternative B and result in positive cumulative impacts.

Reasonably foreseeable fire management projects on the Targhee National Forest include approximately 2,000 acres per year of fuels reduction, as per the 1997 Forest Plan. These reductions will occur through both fire and mechanical treatments (Betz 2003). The scale of the fire activities compared to that of the action alternatives is relatively small. These projects combined are not likely to contribute much to air quality impacts.

The Caribou National Forest just completed its Forest Plan in February 2003. However, the amount of RxFire proposed is relatively small. Compared with any of the action alternatives, fire management activities planned for the Caribou National Forest would not contribute substantially to cumulative impacts.

IDL, in conjunction with the BLM and other federal agencies, signed the Idaho Statewide Implementation Strategy for the National Fire Plan. The strong focus on fire prevention, fuels reduction, restoration, and collaboration among interested parties would help avoid adverse cumulative impacts to air quality when combined with any of the action alternatives.

For air quality, the main issue for cumulative impacts concerns whether these other fire management actions would occur simultaneously with those of the action alternatives and result in exponential amounts of smoke. The other activities involve much smaller scales than the action alternatives. Also, many of the plans under consideration would incorporate decisions from this EIS; therefore, the effects would not be in addition to what is proposed in this plan. Thus, it is unlikely that significant adverse cumulative impacts to air quality would occur when considering other past, present, and reasonably foreseeable future actions in conjunction with any of the action alternatives. And, as fire size, frequency, and severity is moved towards a naturally occurring regime, both instantaneous and long-term air quality would improve.

4.7 ANALYSIS OF EFFECTS ON SOILS

4.7.1 ANALYSIS ASSUMPTIONS AND METHODS

Impacts to soils associated with fire, fuels, and related vegetation management over a ten-year period have been assessed for the District using footprint-acres of various treatments. Impacts to soils include the potential for wind and water erosion. The erosion potential was assessed using STATSGO-level soils data. Soils were classified as water erodible if they occurred on greater than 10 percent slopes or had a K-factor of greater than or equal to 0.32. Additionally, soils were determined to be wind-erodible if the wind erodibility group value was 5 or less (BLM 2001a).

Due to the wide variety of soil types that occur over the landscape area, it was not possible to determine potential soil loss (in tons/acre/year) District-wide. However, it was possible to determine the footprint-acreage for each cover type by alternative. Additionally, acres of water erodible and wind erodible soil for each cover type were determined and expressed as percentage. For example, the BLM manages 330,581 acres of Annual Grass, and of this, 57,833 acres (17.5 percent) are highly susceptible to water erosion. Therefore, if 10,000 acres are treated, then 1,750 of these acres (17.5 percent) would be susceptible to soil erosion.

The relative acreage of highly susceptible soils impacted by fire management treatments was used to assess potential project impacts. The potential impacts are summarized below in Table 4-45.

Some critical assumptions and considerations were made for the soil impacts analysis. Most importantly, the wind and water erosion data presented herein were taken from the STATSGO database. These data are general and were used for this EIS to identify potential wind and water erodible soils. The actual acreage of disturbance to erodible soils could be less.

The acres reported reflect acres of BLM-administered land only. State and private lands, and federal lands other than BLM-administered lands (USFS, INEEL, and Craters of the Moon National Monument and Preserve) were not included.

It was also assumed that the footprint-acreage would adequately represent the surface area disturbed by various treatments. Additionally, areas susceptible to water erosion may also be susceptible to wind erosion; therefore the calculated acres of erodible soils may overlap.

4.7.2 Effects Common to All Alternatives

Soil erosion by wind and water is the primary impact that would occur under all treatments, but the magnitude of impacts between treatments varies greatly (see the following subsections describing treatment effects). Erosion removes topsoil, resulting in lower site productivity. Many low-elevation sites are especially susceptible to wind erosion after wildland fire. Wildland fires consume vegetative cover and result in exposed soils with high surface temperatures. This can negatively affect seed germination and seedling establishment.

RxFire, WFU, and chemical treatments would be followed by seeding (aerial seeding, rangeland drill, transplants, etc). This follow-up treatment would reduce soil erosion by establishing vegetative cover. Under all treatments, biological soil crust disturbance would be inevitable.

Indirectly, wind erosion across denuded sites can negatively affect air quality, as well as reduce visibility, both of which are affected by airborne particulates. Also, soil erosion affects watersheds by contributing to sedimentation, which can negatively affect fish habitat, alter stream channels, and fill downstream reservoirs.

4.7.2.1 Direct and Indirect Impacts of Prescribed Burn (RxFire)

Impacts of RxFire would include loss of vegetative cover and subsequent soil erosion by wind and water. The benefit of RxFire is a controlled ignition, so that erosion-sensitive areas could be avoided. Burned woody debris would provide some protective cover in shrub and timber cover types, but partially burned annual grasses would be highly susceptible to soil erosion. Indirect impacts from RxFire could include sedimentation of streams and reservoirs from wind and water erosion.

4.7.2.2 Direct and Indirect Impacts of Wildland Fire Use (WFU)

Impacts caused by WFU are similar to those described for RxFire, assuming similar locations, times, and management goals. However, the location of the fire cannot be controlled, and erosion-sensitive areas could be burned, resulting in greater post-fire soil erosion than RxFire. As with RxFire, indirect impacts from WFU could include sedimentation of streams and reservoirs from wind and water erosion.

4.7.2.3 Direct and Indirect Impacts of Chemical Treatment

Impacts caused by chemical applications maintain part or all the plant cover, at least until revegetation efforts. Chemical treatments have little effect on soil erosion when compared to the ground disturbing effects of mechanical treatments. Indirect impacts could include movement of chemicals attached to runoff or blown soil particles, and sedimentation of streams and reservoirs.

4.7.2.4 Direct and Indirect Impacts of Mechanical Treatment

Various mechanical manipulations would disturb the soil surface and leave it open without a protective cover of intact, rooted plants. Erosion would likely be less than RxFire or WFU due to plant debris remaining after this treatment. Residual plant debris would cover the soil, protecting it from wind and water erosion. Indirect impacts from mechanical treatments could include sedimentation of streams and reservoirs from wind and water erosion, but would be less than RxFire and WFU due to the residual plant debris.

4.7.2.5 Direct and Indirect Impacts of Seeding Treatment

Seeding and other revegetation treatments would be used after other treatments are implemented (RxFire, WFU, chemical, and mechanical). Seeding by a rangeland drill would churn the soil surface and lead to minor wind borne erosion. However, the revegetation resulting from seeding would eventually reduce erosion. Aerial seeding would have virtually no impact on soils. Indirect impacts from seeding could include sedimentation of streams and reservoirs from wind and water erosion, but would be less than RxFire and WFU due to the residual plant debris because seeding practices do not disturb surface soils as greatly as RxFire or WFU.

4.7.3 ALTERNATIVE A

Alternative A would have the least impact to soil resources, initially. This alternative has the smallest total footprint (249,990 acres), and the least amount of wind and water erodible soils would be disturbed at 169,935 and 40,724 acres, respectively (see Table 4-45). However, with treatments progressing at their current rate, large areas of land would have abnormally high fuel loadings and greater fire frequency. Since Alternative A has the smallest total footprint, indirect sedimentation impacts to streams and reservoirs would be less than all other alternatives.

4.7.4 ALTERNATIVE B

Under Alternative B, increased extent of vegetation treatments could increase erosion temporarily on sites that are being treated. Initial erosion impacts under Alternative B would be roughly twice as much as Alternative A. Alternative B footprint area would total 646,000 acres, and would disturb 397,415 acres of wind erodible soils and 109,019 acres of water erodible soils (see Table 4-45). However, short-term impacts to soil erosion in Alternative B are far outweighed by increased levels of revegetation across the District. In the short term, sedimentation would occur at roughly twice the rate as Alternative A. However, successful ES&R and restoration would minimize the amount of sedimentation under this alternative.

4.7.5 ALTERNATIVE C

Under Alternative C, increased vegetation treatments would increase erosion temporarily on sites that are being treated through RxFire, mechanical, or chemical means. Footprint-acres would total 1,686,528 acres, and initial wind and water erosion impacts would be approximately 2.5 times greater than Alternative B at 1,055,646 and 321,723 acres, respectively (see Table 4-45). Since these treatments would ultimately increase revegetation success, it would be expected that soil erosion would decrease after successful ES&R and restoration. Sedimentation would occur at roughly 2.5 times the rate as Alternative B. However, successful ES&R and restoration would minimize the amount of sedimentation under this alternative.

4.7.6 ALTERNATIVE D

Under Alternative D, increased vegetation treatments would increase erosion temporarily on sites that are being treated either through RxFire, mechanical, or chemical means. Approximately 1,522,270 footprint-acres would be treated under Alternative D and would impact 1,032,049 acres of wind erodible soils and 260,891 acres of water erodible soils (see Table 4-45). Alternative D differs from Alternative C in that Dry Conifer, Aspen/Conifer, Salt Desert Shrub, Vegetated Rock/Lava, Wet/Cold Conifer, and Riparian cover types would not receive treatment. Since treatments under Alternative D would ultimately increase revegetation success, it would be expected that soil erosion would decrease after successful ES&R and restoration. Sedimentation

would occur at roughly 2.5 times the rate as Alternative B, and sedimentation rates under Alternative D would be similar to Alternative C. However, successful ES&R and restoration would reduce the amount of sedimentation under this alternative.

TABLE 4-45. SUMMARY OF WIND- AND WATER-ERODIBLE SOILS UNDER EACH ALTERNATIVE (IN FOOTPRINT-ACRES)[1]

Vegetation Cover Type	Total BLM Acres	Wind Erodible Soils (%[2])	Water Erodible Soils (%[2])	Alternative A			Alternative B			Alternative C			Alternative D		
				Total	Wind	Water	Total	Wind	Water	Total	Wind	Water	Total	Wind	Water
Low-elevation Shrub, Perennial Grass, and Annual Grass	3,297,832	2,085,898 (63%)	436,444 (21%)	211,705	150,319	31,763	462,600	300,479	63,433	1,006,050	729,469	155,536	1,329,756	892,706	188,756
Mid-elevation Shrub, Juniper	939,748	448,546 (48%)	232,714 (52%)	25,475	11,918	6,603	124,790	62,045	27,647	496,200	236,482	123,034	254,670	121,366	63,153
Mountain Shrub	339,815	167,958 (49%)	83,916 (25%)	2,825	1,396	697	31,530	15,580	7,784	141,658	69,999	34,973	36,380	17,977	8,982
Dry Conifer and Aspen/Conifer	145,058	66,326 (46%)	47,134 (71%)	4,600	2,103	1,495	30,650	13,898	10,048	19,764	8,986	6,462	0	0	0
Salt Desert Shrub	37,792	11,168 (30%)	652 (2%)	975	288	17	0	0	0	115	34	2	0	0	0
Vegetated Rock/Lava	582,057	545,085 (94%)	10,734 (2%)	3,820	3,577	70	5,780	5,413	107	7,083	6,633	131	0	0	0
Wet/Cold Conifer	24,965	11,135 (45%)	4,693 (19%)	220	98	41	0	0	0	8,050	3,590	1,513	0	0	0
Riparian	30,903	19,728 (64%)	3,139 (10%)	370	236	38	0	0	0	709	453	72	0	0	0
Totals	5,398,170	3,337,844 (62%)	819,425 (15%)	249,990	169,935	40,724	646,000	397,415	109,019	1,679,629	1,055,646	321,723	1,620,806	1,032,049	260,891

[1] The erodible soil calculations for each footprint in each alternative assume that erodible soils are uniformly distributed throughout each cover type. Water and wind erodible acreage for each alternative were calculated using the percentage of water or wind erodible soils in each cover type.

[2] Percentage of water or wind erodible acres per cover type.

4.7.7 Unavoidable Adverse Impacts

Biological soil crusts would likely be unavoidably impacted under the action alternatives since active measures, including WFU, RxFire, and other vegetation treatments, would be needed to restore cover types to FRCC 1. Revegetation of treated sites and restored ecosystem function would ensure the eventual re-establishment of biological soil crusts. However it could take a minimum of 50 years to establish a protective biological soil crust, depending on the presence of crust-forming organisms available to inoculate a treated site. Additionally, wildland fire and associated suppression efforts would damage or destroy biological soil crusts.

4.7.8 Irretrievable and Irreversible Commitment of Resources

Irretrievable impacts to biological soil crusts would occur as described above. These impacts would not be irreversible, however, as these biological crusts could re-establish with effective rehabilitation/restoration.

4.7.9 Cumulative Effects

Cumulative impacts to soils are considered relative to the long-term effects of Alternative B in conjunction with other fire management activities in the District. These similar plans include the Interior Columbia Basin Ecosystem Management Project MOU with the BLM, the INEEL management plan, the Sawtooth, Caribou, and Targhee National Forests management plans, and the Idaho Statewide Implementation Strategy for the National Fire Plan.

Overall, most of the goals of these plans are to reduce the severity and duration of fires in the region. Of these plans, the INEEL management plans, the National Forest management plans, and the Idaho Statewide Implementation Strategy for the National Fire Plan would result in disturbance in addition to the acreages disclosed in Table 4-45. Treatment methods and acres for INEEL have not yet been determined (these plans were being written at the time this EIS was released), and these lands are entirely encompassed by the District boundary. The Sawtooth National Forest is currently revising its Forest Plan, and depending on the alternative selected, approximately 60,000 to 300,000 acres of the forest would be treated over the long term. The Caribou and Targhee National Forests intend to treat 9,000 acres per year over the long-term. The Idaho Statewide Implementation Strategy for the National Fire Plan would focus on Wildland Urban Interface lands. Relative to most of the District's project alternatives, these additional fire treatment impacts are minimal over the long-term.

As discussed above, reducing the severity and duration of fires would, over the long run, reduce soil erosion over the District. Erosion impacts relating to increased RxFire, WFU, ES&R and restoration, or other fire management practices would occur. However, as mentioned above, seeding and subsequent revegetation following treatments would mitigate many of these impacts. Cumulative impacts may vary, however, depending on which project alternative is implemented; thus cumulative impacts must be examined relative to the action alternatives in terms of their contribution to other plans for reducing the severity and duration of fires.

In general, the cumulative effects on soil resources for each alternative are related to the amount of acreage moving from FRCC 3 or 2 to FRCC 1. Movement of cover types to FRCC 1 would ultimately result in reduction of fuels and fire frequency, leading to decreased soil erosion.

The project alternatives presented herein would have a much greater effect on soil resources than other reasonably foreseeable future actions would, because the District encompasses a much

larger area (5.4 million acres). Over a 30-year period, Alternative A would change the FRCC of the least number of acres (250,240 acres) of the four alternatives. Thus, Alternative A would have the least positive contribution to the cumulative impacts of the other plans and management strategies in the foreseeable future. The Alternative B would result in an increased number of acres (646,050 acres) with an improved FRCC relative to Alternative A. However, under either Alternatives C or D, at least 28 percent of the BLM-administered land area would be treated (1,686,528 and 1,522,270 acres respectively) over a 30-year period. Thus, these action alternatives would have a significant positive contribution to the cumulative impacts by reducing soil erosion, when considered in conjunction with other actions in the region.

4.8 ANALYSIS OF EFFECTS ON WATER RESOURCES

4.8.1 ANALYSIS ASSUMPTIONS AND METHODS

Water resources respond to changes in fire, fuels and vegetation management since factors that influence hydrological functions are dependent on several factors. These include a fire's impact on vegetation, how a fire modifies the landscape, and the timing of subsequent precipitation events. Intense wildland fires create conditions that can reduce soil-water infiltration, promote surface runoff, and change water quality. The steepness of a hillside influences the risk of any site to overland flow and surface erosion, and is also related to the rate at which the site is revegetated after a fire. Soil disturbance directly influences surface water resources.

Because proposed acreages (footprint) to be treated in Riparian cover types are 709 acres or less for any alternative, it was assumed treatments would have negligible impacts on water resources. Treatments occurring in non-riparian cover types would be primary causes of impacts, if any, to water resources.

It was also assumed that the footprint-acreage would adequately represent the surface area disturbed by various treatments. Additionally, areas susceptible to water erosion may also be susceptible to wind erosion, and that the acres calculated may overlap, though wind erosion does not impact water resources to the degree of water erosion.

4.8.2 EFFECTS COMMON TO ALL ALTERNATIVES

Water erosion is the primary impact that would occur under all treatments, but the magnitude of impacts between treatments varies greatly (see below). Some low-elevation sites are especially susceptible to wind erosion, as well as water erosion, after wildland fire. Wildland fires consume vegetative cover and result in exposed soils that are at risk for wind erosion, as well as water erosion, until regrowth occurs.

Soil erosion affects watersheds by contributing to sedimentation. Sedimentation can negatively affect fish habitat, alter stream channels, and fill downstream reservoirs.

4.8.2.1 Direct and Indirect Impacts of Prescribed Burn (RxFire)

Impacts to water resources from RxFire would include sedimentation of streams and reservoirs from water runoff as a result of post-burn erosion. However, the benefit of RxFire is that it is set in a controlled environment, and erosion-sensitive areas could be avoided and fire intensity and size can be controlled depending on GPA designation.

4.8.2.2 Direct and Indirect Impacts of Wildland Fire Use (WFU)

Impacts caused by WFU are similar to those described for RxFire, assuming similar locations, timing, and management objectives. However, the location of the fire cannot be controlled, and erosion-sensitive areas could be burned, resulting in greater post-fire risk of sedimentation than RxFire.

4.8.2.3 Direct and Indirect Impacts of Chemical Treatment

There should be no impacts to water resources from use of chemicals when they are applied according to label instructions. Any chemicals that move from treated areas to surface waters should degrade quickly. Chemical applications would conform to application criteria described in the 1991 Environmental Impact Statement for Vegetation Treatment on BLM Lands in Thirteen Western States. Additionally, use would conform, to instructions from BLM Manual 9011 Chemical Pest Control, as well as label restrictions and current policies. (See Section 2.4.3.3.2).

4.8.2.4 Direct and Indirect Impacts of Mechanical Treatment

Various mechanical manipulations would disturb the soil surface and leave it open without a protective cover of intact, rooted plants. Wind erosion would likely be less than RxFire or WFU due to plant debris remaining after this treatment (see Section 4.7.2.4).

As with other treatments some sedimentation would occur, but to a lesser extent than RxFire and WFU.

4.8.2.5 Direct and Indirect Impacts of Seeding Treatment

Ground-seeding operations would cut furrows in the soil and lead to minor soil loss. Stream sedimentation caused by soil erosion from seeding would be negligible. Additionally, the revegetation resulting from seeding would reduce erosion. Aerial seeding would have no impact on water resources.

4.8.3 ALTERNATIVE A

Considering all cover types, Low-elevation Shrub, Perennial Grass, and Annual Grass would contain the largest acreage of water-erodible soils proposed for treatment under Alternative A, and thus has the potential to cause impacts to water resources as a result of treatments (see Table 4-45). However, less than 1 percent of the proposed treatments in all cover types would occur on water-erodible soils (see Table 4-45). Thus, overall, impacts to water resources would be negligible across the District.

4.8.4 ALTERNATIVE B

Low-elevation Shrub, Perennial Grass, Annual Grass, Mid-elevation Shrub, and Juniper cover types contain areas susceptible to wind and water erosion. Approximately 6 percent of the proposed treatments for all cover types would occur on wind-erodible soils, while less than 2 percent would occur on water-erodible soils (see Table 4-45) under the Alternative B. Overall, the effective implementation of management restrictions would insure that impacts to water resources described in Section 4.8.2 would minimal across the District.

4.8.5 ALTERNATIVE C

Approximately 17 percent of the proposed treatments for all cover types would occur on wind-erodible soils, while approximately 6 percent would occur on water-erodible soils (see Table 4-45) under Alternative C. With the effective implementation of management restrictions, impacts to water resources, described in Section 4.8.2, would be minimal across the District. Low-elevation Shrub, Perennial Grass, Annual Grass, Mid-elevation Shrub, and Juniper cover types would contain the majority of acreage susceptible to wind and water erosion.

4.8.6 ALTERNATIVE D

Approximately 19 percent of the proposed treatments for all cover types would occur on wind-erodible soils, while approximately 5 percent would occur on water-erodible soils (see Table 4-45) under Alternative D. With the effective implementation of management restrictions, impacts to water resources described in Section 4.8.2 would minimal across the District. Low-elevation Shrub, Perennial Grass, Annual Grass, Mid-elevation Shrub, and Juniper cover types would contain the majority of acreage susceptible to wind and water erosion. No treatments are proposed in Dry Conifer, Aspen/Conifer, Salt Desert Shrub, Vegetated Rock/Lava, Wet/Cold Conifer, or Riparian cover types; therefore they would not be expected to contribute to impacts to water resources.

4.8.7 MITIGATION AND MONITORING

With the implementation of management restrictions discussed in Chapter 2, Description of Alternatives, mitigation would not be necessary. Monitoring and adaptive management would occur as directed by individual field offices and fire plans.

4.8.8 UNAVOIDABLE ADVERSE IMPACTS

There would be no unavoidable adverse impacts to the water resources.

4.8.9 IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES

There would be no irretrievable or irreversible impacts to water resources.

4.8.10 CUMULATIVE EFFECTS

Cumulative impacts to water resources are considered relative to the long-term effects of the action alternatives in relation to other similar plans. These similar plans include the Interior Columbia Basin Ecosystem Management Project MOU with the BLM, the INEEL management plan and various other agency plans. The Sawtooth National Forest is currently revising its Forest Plan, and depending on the alternative selected, approximately 60,000 to 300,000 acres of the forest would be treated over the long term. The Caribou and Targhee National Forests intend to treat 9,000 acres per year over the long term. The Idaho Statewide Implementation Strategy for the National Fire Plan would focus on Wildland Urban Interface lands. Relative to most of the District's project alternatives, these additional fire treatment impacts are negligible over the long term.

Overall, goals of these plans include reduction of reduce the intensity and duration of fires in the region. Over the long run, this would reduce water erosion and sedimentation, across the District. Water resource impacts that relate to increased RxFire, WFU, ES&R and restoration, or other fire management practices would occur. However, as mentioned above, seeding and revegetation would mitigate many of these impacts. Cumulative impacts in the District may vary, however,

depending on which alternative is implemented for this project. In general, the cumulative effects on water resources for each alternative are related to the amount of acreage moving from FRCC 3 or 2 to FRCC 1. Movement of cover types to FRCC 1 would ultimately result in reduction of fuels and fire frequency, leading to decreased soil erosion and subsequent impacts to water resources.

Project alternatives would have a much greater effect on water resources than other reasonably foreseeable future actions because the District would enact the largest amount of fire management over the largest area (5.4 million acres). Over a 30-year period, Alternative A would change the FRCC of the least number of acres (250,200 footprint-acres) of the four alternatives and have the least positive contribution to cumulative impacts when considered in conjunction with other plans and management strategies in the foreseeable future. The Alternative B would result in an increased number of acres (646,600 footprint-acres) in better FRCC relative to Alternative A. However, under either the Alternatives C or D, at least 28 percent of the BLM-administered land area would be treated (1,686,528 and 1,522,270 footprint-acres, respectively) over a 30-year period. Thus, these action alternatives would have a significant positive cumulative impact by reducing negative effects to water resources, when considered in conjunction with other actions in the region.

4.9 ANALYSIS OF EFFECTS ON LIVESTOCK GRAZING MANAGEMENT

4.9.1 ANALYSIS ASSUMPTIONS AND METHODS

Fire, whether RxFire or wild, may have direct positive and/or negative impacts on livestock grazing on BLM-administered lands in the District. It is predicted, however, that as the 12 cover types move towards FRCC 1, overall species composition and structure would improve. Additionally, improving the FRCC would generally reduce the risk of large, frequent fires impacting forage production. This would also allow forage-producing areas to recover quicker from wildland fires and require less rehabilitation. Alternative B and other action alternatives may reduce the number of long-term allotment closures and AUMs temporarily unavailable, maintain and improve the health of the rangelands, improve wildlife habitat/watershed conditions, and improve overall forage production.

Several assumptions were made in developing the analysis for impacts to livestock grazing. These assumptions include: 1) it requires 10 acres of land in the District to produce the 800 pounds of forage per month to maintain one AUM, 2) treatment areas would be rested from livestock grazing for two growing seasons following a treatment or fire, and 3) AUMs lost as a result of resting these treatment areas would become available again after two growing seasons. However, this two-growing season time limit may be extended if the BLM determines that the vegetation has not adequately recovered from the treatment. Areas identified for RxFire may also be rested one or two years prior to a treatment. The price to purchase hay was set at $100 per ton. The cost to lease land was set at ($10.49 per AUM) on private land and $1.37 per AUM on BLM-administered land. Both of these figures are average lease rates in Idaho for the past five years (1998 through 2002).

4.9.2 EFFECTS COMMON TO ALL ALTERNATIVES

Direct and indirect impacts for all vegetation treatment methods generally result in a short-term loss of AUMs while these treatment areas are being treated and/or being rested from livestock

grazing preceding or following a treatment. Successful vegetation treatments involving the use of RxFire, WFU, mechanical, chemical, and/or seeding are often weather and site-dependent. Pre and post treatment resting may necessitate 1) adjusting seasons of use for livestock grazing, 2) adjusting grazing systems, 3) using pastures scheduled for rest or deferred grazing, 4) construct temporary fencing around treatment areas, 5) reducing the number of livestock authorized to graze, or 6) total removal of livestock from the allotment. These allotment restrictions would be dealt with on a site-specific basis in the planning process for each vegetation treatment. These allotment restrictions may require permittees to lease additional private land, purchase additional feed, or reduce overall livestock numbers during this interim period. Additional disturbance to livestock could occur during vegetation treatment and fire fighting activities (i.e., increased noise, traffic, construction of fire breaks, etc).

Permittees with allotments that have grazing seasons beginning or extending into the summer and fall periods may also be affected by wildland fire activity and vegetation treatments. Wildland fires generally occur across the District beginning in July and ending mid-September. Treatments for the reduction of fire hazards and rehabilitation of wildland fire burned areas are generally initiated in the fall and completed in the winter. As these treatments are initiated, temporary removal of livestock would be necessary to assure success of the particular treatment and establishment of desired vegetation.

4.9.2.1 Direct and Indirect Impacts of Prescribed Burn (RxFire)

RxFire would be used in all cover types, except Salt Desert Shrub, where conditions such as access, adjacent vegetation and terrain, and climatic conditions are sufficient to provide adequate control of the RxFire. Effects of RxFire on rangeland resources are predominantly negative to livestock grazing. An RxFire would displace livestock from the treatment area for a minimum of two growing seasons following the treatment. Treatment areas may also need to be rested from grazing for 1 to 2 years prior to the RxFire to increase fine fuels enough to carry an RxFire.

4.9.2.2 Direct and Indirect Impacts of Wildland Fire Use (WFU)

WFU would be utilized in all cover types. WFU would primarily be in remote areas where the benefits of fire are greater than the risk and cost of putting it out. Effects of WFU on rangeland resources are also predominantly negative to livestock grazing. WFU would displace livestock during the management of fire. WFU would also displace livestock from the burned allotment for a minimum of two growing seasons following the fire to allow vegetation to regenerate.

The control of WFU burns could possibly be less than those ignited intentionally and could result in loss of range improvements (fences, livestock waters, etc). This could alter livestock use and distribution patterns on portions of the allotment(s) not affected by wildland fire. Natural starts would be suppressed if the fire posed a threat to the long-term stability of the rangeland resource.

4.9.2.3 Direct and Indirect Impacts of Chemical Treatment

Chemicals (herbicides) would be used in all cover types, except Salt Desert Shrub and Wet/Cold Conifer, for fuels reduction activities. These chemicals may be applied both aerially and from the ground depending on the extent and cover type being treated. Only herbicides approved for use on BLM-administered lands would be used in these vegetation treatments. Short-term effects of most chemical treatments on rangeland resources are predominantly negative to livestock grazing. Most chemical treatments would be used in conjunction with other vegetation treatments in an effort to reduce the seedbed of annual grasses. All other chemical treatments

would be limited to spot treatments of noxious weed infestations and would not impact livestock grazing.

4.9.2.4 Direct and Indirect Impacts of Mechanical Treatment

Mechanical treatments would be used in all cover types, except Salt Desert Shrub. These treatments would vary considerably between cover types and may include using hand-operated tools to thin conifer and juniper, chaining to thin juniper and sagebrush, drill seeding, and harrowing or chaining to cover grass and shrub seed. Short-term direct effects of mechanical treatments of rangeland resources will result in the temporary loss of AUMs available for livestock grazing while the treatment areas are rested from livestock grazing as vegetation in the treatment area becomes re-established.

4.9.2.5 Direct and Indirect Impacts of Seeding Treatment

Seeding would be used in all cover types, except Wet/Cold Conifer. Short-term direct effects would result in the temporary loss of AUMs available for livestock grazing while the treatment areas are rested from livestock grazing as the seeded vegetation becomes established.

4.9.3 ALTERNATIVE A

Alternative A would result in 47,500 AUMs being temporarily unavailable over the next 10-year period. This reduction of AUMs represents approximately 0.7 percent of the AUMs available in the District. The loss of revenue to the BLM in the form of grazing fees would be $65,075 over the next 10-year period. If permittees do not have sufficient private land for their livestock while public lands are rested for the two years following the vegetation treatment, they may need to lease additional private rangeland for their livestock. If permittees have sufficient private land of their own additional feed may need to be purchased for those livestock temporarily removed from the public lands. The estimated cost of this alternative to livestock owners in the District to lease private land while the allotments are rested is estimated to be $519,650 and hay purchase cost is estimated to be $1,900,000 over the next 10-year period. This alternative would produce the least amount of AUMs being temporarily unavailable, the least amount of loss of short-term revenue in the form of grazing fees, and result in the least amount of short-term cost to livestock owners in the form of leasing private land and purchasing additional feed over the short term.

4.9.4 ALTERNATIVE B

Alternative B would result in 122,783 AUMs being temporarily unavailable over the next 10-year period. This reduction of AUMs represents approximately 1.8 percent of the AUMs available in the District. The loss of revenue to the BLM in the form of grazing fees would be $168,213 over the next 10-year period. If permittees do not have sufficient private land for their livestock while public lands are rested for the two years following the vegetation treatment, they may need to lease additional private rangeland for their livestock. If permittees have sufficient private land of their own additional feed may need to be purchased for those livestock temporarily removed from the public lands. The estimated cost of this alternative to livestock owners in the District to lease private land while the allotments are rested was estimated to be $1,362,319 and hay purchase cost was estimated to be $4,987,040 over the next 10-year period. This alternative would increase the amount of AUMs being temporarily unavailable, the amount of loss of revenue in the form of grazing fees, and the cost to livestock owners in the form of

leasing private land and purchasing additional feed by approximate 262 percent when compared to Alternative A.

4.9.5 ALTERNATIVE C

Alternative C would result in 320,467 AUMs being temporarily unavailable over the next 10-year period. This reduction of AUMs represents approximately 4.8 percent of the AUMs available in the District. The loss of revenue to the BLM in the form of grazing fees would be $439,040 over the next 10-year period. If permittees do not have sufficient private land for their livestock while public lands are rested for the two years following the vegetation treatment, they may need to lease additional private rangeland for their livestock. If permittees have sufficient private land of their own, additional feed may need to be purchased for those livestock temporarily removed from the public lands. The estimated cost of this alternative to livestock owners in the District to lease private land while the allotments are rested was estimated to be $3,491,212 and hay purchase cost was estimated to be $12,764,960 over the next 10-year period. This alternative would increase the amount of AUMs being temporarily unavailable, the amount of loss of revenue in the form of grazing fees, and the cost to livestock owners in the form of leasing private land and purchasing additional feed by approximate 672 percent when compared to Alternative A.

4.9.6 ALTERNATIVE D

Alternative D would result in 289,268 AUMs being temporarily unavailable over the next 10-year period. This reduction of AUMs represents approximately 4.3 percent of the AUMs available in the District. The loss of revenue to the BLM in the form of grazing fees would be $396,297 over the next 10-year period. If permittees do not have sufficient private land for their livestock while public lands are rested for the two years following the vegetation treatment, they may need to lease additional private rangeland for their livestock. If permittees have sufficient private land of their own additional feed may need to be purchased for those livestock temporarily removed from the public lands. The estimated cost of this alternative to livestock owners in the District to lease private land while the allotments are rested was estimated to be $3,368,995 and hay purchase cost was estimated to be $12,318,080 over the next 10-year period. This alternative would increase the amount of AUMs being temporarily unavailable, the amount of loss of revenue in the form of grazing fees, and the cost to livestock owners in the form of leasing private land and purchasing additional feed by approximate 648 percent when compared to Alternative A.

4.9.7 MITIGATION AND MONITORING

The management restrictions listed in Chapter 2, Description of Alternatives are incorporated into management practices common to all alternatives. These practices would be implemented to avoid adverse impacts to resources related to livestock grazing. Because of this, no further mitigation would be required to protect these resources.

4.9.8 UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts to livestock grazing due to this planning effort include the potential of short-term suspension, delay, or authorizing livestock grazing at lower than pre-treatment levels until the treatment area is adequately rehabilitated and/or restored. However, these short-term impacts are currently being experienced and would continue under Alternative A. These

short-term impacts would be offset by the long-term improvements to overall range health resulting from increased fire, fuels, and vegetation management. This, in turn would reduce the potential for long-term suspension, delay, or reduction of livestock grazing in the treated allotments.

4.9.9 Irretrievable and Irreversible Commitment of Resources

Irretrievable impacts to livestock grazing would include the short-term loss of AUMs as described above. However, this short-term habitat loss would not be irreversible, as these AUMs would be returned to active grazing after rehabilitation/restoration.

4.9.10 Cumulative Effects

Cumulative impacts to livestock grazing include all past, present, and future fire management actions that may impact livestock grazing associated with the District. To reduce negative impacts livestock grazing, efforts must be made between other federal and state agencies as well as private landowners to coordinate land use directions. There are several planning efforts that incorporate fire use strategies currently underway which may, in conjunction with this planning effort, affect the rangeland resources associated with the District. These plans include the Interior Columbia Basin Ecosystem Management Project, the INEEL management plan, the Sawtooth and Caribou-Targhee National Forests management plans, and the Idaho Statewide Implementation Strategy for the National Fire Plan. Overall, the primary goal of these plans is to reduce the intensity and extent of wildland fires in the region. The means proposed to meet this goal is broadly similar to many actions proposed of the various alternatives in this EIS, and include RxFire, WFU, ES&R, and restoration activities.

As discussed above, impacts to livestock grazing from fire predominantly relates to the intensity and extent of the fire. In general, large frequent fires result in increased negative impacts to rangeland resources. Thus, reducing the extent and frequency of fires would, over the long run, reduce negative impacts to livestock grazing in the District. There could possibly be increased short-term impacts to livestock grazing relating to increased RxFire, WFU, ES&R and restoration, or other fire management practices. As described above for each alternative, vegetation treatments have the potential to negatively affect livestock grazing. Thus, there is the potential for increased negative cumulative impacts in the short term from the actions proposed in this EIS when considered in conjunction with other fire management activities in the area. Overall, cumulative impacts may vary, depending on which project alternative is implemented, cumulative impacts must be examined relative to the alternatives in terms of their contribution to the cumulative impacts of other plans for reducing the extent and frequency of fires.

In general, the cumulative effects on livestock grazing for each alternative action of the various fire management plans being developed would be related to the amount of acreage moving from FRCC 3 to FRCC 1. Because the general goals of the other fire management plans and regional strategies are to, in essence, reduce the amount of acreage in FRCC 3 and increase the amount in FRCC 1, these plans should have a positive long-term effect on livestock grazing by reducing the potential for large-scale damage to rangeland resources. Consequently, the alternatives proposed in this EIS should also be considered in terms of their overall contribution to reducing the extent and frequency of wildland fires. Alternatives that achieve a reduction in the extent and frequency of wildland fires would, in combination with the actions undertaken in other regional plans, have a greater positive effect than those that do not reduce, or reduce in lower amounts, the extent and frequency of wildland fires.

Of the four alternatives described in this EIS, Alternative A changes the FRCC of the least number of acres. Thus, Alternative A would have the least positive cumulative impact on the other plans and management strategies in the foreseeable future. Alternative B would result in an increased number of acres with a changed FRCC relative to Alternative A. Relative to Alternative A, Alternative B would have a greater positive cumulative impact. However, Alternatives C and D both result in substantial shifts of rangeland to FRCC 1. Thus, these alternatives would have an additional positive cumulative contribution on livestock grazing when considered with the other fire management plans in the region than either Alternative A or Alternative B.

4.10 ANALYSIS OF EFFECTS ON RECREATIONAL RESOURCES

4.10.1 ANALYSIS ASSUMPTIONS

The analysis assumptions for recreational resources were that: 1) RxFire would be considered for use in dispersed and developed recreational areas to protect them from or minimize the impacts of catastrophic wildland fire on these areas; 2) RxFire, chemical, seeding, and/or mechanical treatments would be used to improve FRCCs; and 3) wildland fire or RxFire would expose previously hidden recreational resources that could become subject to unmanaged use.

4.10.2 EFFECTS COMMON TO ALL ALTERNATIVES

The effects of fire management on recreational resources within the District are based on the impacts produced by modifying and maintaining vegetation in the various FRCCs. The impacts would include: the potential exposure after fire of livestock and game trails to unauthorized OHV use; the potential exposure after fire of previously hidden lava tube and cave entrances to unmanaged exploration; limited access to recreational areas during RxFire, mechanical, seeding, and/or chemical treatments, or wildland fire; the temporary closing of dispersed and developed recreational areas during land restoration following treatments to maintain or change FRCCs; and the potential loss of facilities within developed recreational areas from catastrophic wildland fire.

In general, fire management in the District's dispersed recreational areas would use RxFire, chemical, mechanical, and seeding treatments. The same treatments would be used in the vicinity of developed areas associated with high-density recreational opportunities or where recreational facilities have been constructed. RxFire would be used where appropriate. As cover types are moved toward improved FRCCs, the risk of large-scale catastrophic wildland fire is also reduced. This in turn would reduce the potential magnitude of impacts to recreational resources for the impacts described above.

4.10.2.1 Direct and Indirect Impacts

For all of the treatments, indirect, adverse effects could be produced by fences or barriers used to exclude livestock from the treated areas, which could alter the scenic quality of the landscape and reduce the recreational expectations of solitude, remoteness, and an undeveloped landscape. The exposure after fire treatment of the District's generally fine, loess-type soil to typical summer convection winds could produce dust storms (particularly in the District's lower elevation areas) that indirectly reduce visibility. This reduction in visibility could degrade scenic quality within the District and potentially reduce the recreational opportunities of sightseers.

The effects of fire suppression on recreational resources, for all of the alternatives, would vary, depending upon the methods used for suppression. The application of water and/or fire retardant in the vicinity of recreational areas would not affect recreational opportunities, but brightly colored fire retardant could produce minor, adverse reductions in scenic quality. Access to burned areas and areas in the vicinity of dozer lines and firebreaks would be temporarily restricted, which would have minor, beneficial effects by reducing further impacts from OHV use, preventing the establishment of OHV routes along exposed game and livestock trails, and the prevention of potential unmanaged use of exposed lava caves and tubes. Minor, adverse effects would be produced by the exclusion of recreationists from these areas until seeding and/or vegetation recovery.

Over time, effects of fire suppression and containment would vary. The construction of firelines, firebreaks, and access roads for crews and equipment could produce beneficial impacts on recreational resources within the District by preserving recreational areas from catastrophic wildland fire. Fire suppression could also produce adverse effects on recreational opportunities in the loss of scenic quality or the loss of an expected sense of remoteness, loss of a sense of solitude, and the loss of an undisturbed recreational landscape through the creation of these landscape-disturbing features.

4.10.2.1.1 Prescribed Burn (RxFire)

RxFire in recreational areas could have adverse effects on recreational opportunities by limiting access to burned areas. Specifically, in dispersed recreational areas, hunting areas could be adversely affected, with higher elevation hunting areas receiving the greatest impacts. Other dispersed recreational activity areas, used for all-terrain vehicle riding and/or mountain biking, could also be adversely affected. These areas would be closed or have limited access until fire management treatment, seeding, and recovery were completed. Beneficial, indirect impacts could be produced by: 1) the reduction in the potential for catastrophic wildlife in developed and dispersed recreational areas; and the introduction of a diversity of cover types that could enhance the recreational opportunity through improved scenic quality and a greater diversity of wildlife.

4.10.2.1.2 Wildland Fire Use (WFU)

Impacts to recreational resources as a result of implementing WFU would be similar to those described under RxFire, assuming wildland fires occur at similar locations and times, and similar management objectives are met.

4.10.2.1.3 Chemical Treatment

For all the alternatives, the use of chemical treatments would have minor adverse effects on recreational resources. Some scenic contrasts might be visible between treated and untreated areas in exotic Annual Grass cover types in the spring, but for most of the year, the effects of treatment would be visually consistent with normal grass curing. Recreational opportunities would be limited in the vicinity of these areas until they are reopened for public use.

4.10.2.1.4 Mechanical Treatment

Mechanical treatments, using a variety of mowing, chaining, chopping, or hand-operated cutting tools, could affect recreational resources, but the effects would depend upon the type of treatment. Mowing would have minor adverse effects on recreational opportunities by temporarily altering scenic quality. Chopping and chainsaw treatments could degrade scenic quality if the effects of tree stumps and/or ground disturbances were not mitigated, but the effects

would generally be minor, as existing vegetation would tend to screen the effects. Mechanical chaining treatments could produce adverse changes in recreational opportunities if the affected areas are highly visible, particularly in those areas where high scenic quality, a sense of remoteness, and/or an undisturbed landscape are expected by recreationists.

4.10.2.1.5 Seeding Treatment

The effects of seeding treated areas would vary. Aerial broadcast seeding, followed by harrowing or chaining, would tend to produce minor, adverse soil surface disturbances that could create visual landscape contrasts. These contrasts could reduce the recreational expectation of solitude or an undeveloped, scenic landscape, but the effects would tend to dissipate after vegetation re-growth.

Drill seeding could produce minor adverse and beneficial effects similar to those for mechanical fire treatments. Adverse visual effects produced by drill-row surface soil disturbances could persist for decades on the landscape, possibly reducing the sense of remoteness and solitude, and the expectations of an undeveloped landscape. Beneficial effects of drill-seeding would be produced by the introduction of vegetation that either contributes to cover type diversity or mimics the structure of the surrounding native cover type.

4.10.2.2 Fire Regime Condition Class (FRCC)

Long-term beneficial impacts of fire management would be produced by moving the District toward FRCC 1. This would maintain a diversity of cover types, which could enhance the recreational experience and expand the range of recreational opportunities within the District. Fire management would also reduce, in the long term, the potential for fire to impact existing recreational facilities and sites. Moving the District toward FRCC 2 would also produce long-term beneficial impacts similar to those under FRCC 1, but the range of cover type diversity would not be as great under FRCC 2. The moderate threat of catastrophic wildland fire would have a potentially adverse effect on recreational resources by reducing recreational opportunities in burned areas. Under FRCC 3, the potential for frequent and/or severe wildland fire would remain high, with potential long-term adverse effects from a reduction in recreational opportunities in areas burned by fire.

4.10.3 ALTERNATIVE A

Alternative A would result in a relatively small number of annual vegetation treatments for all cover types (250,200 acres total). This alternative could have direct impacts on recreational resources by decreasing public access to these recreational areas during treatment and recovery periods. The short-term maintenance of FRCC at FRCC 2 and 3 could potentially threaten recreational areas and facilities within the District due to moderate to high risk of wildland fire. Beneficial effects would be similar to those described in Section 4.10.2.

Alternative A would maintain 26 percent of the District in FRCC 3, 62 percent of the District would be moved toward FRCC 2, and 12 percent would be moved toward FRCC 1 over a 30-year period. Maintaining these proportions would produce the least amount of area in the District at improved FRCCs. This alternative would tend to maintain the existing high potential for exposure and subsequent exploitation of game or livestock trails by OHV users, exposure and subsequent unmanaged exploration of exposed lava caves and tubes, limited access to recreational areas following wildland fire, and the greatest potential for loss of recreation facilities during and following large catastrophic wildland fires.

4.10.4 ALTERNATIVE B

Alternative B would result in more annual vegetation treatments in the Aspen/Conifer, Annual Grass, Dry Conifer, and Low-elevation Shrub, Mid-elevation Shrub, Juniper, and Mountain Shrub cover types (646,200 acres) than Alternative A. This alternative would have direct impacts on recreation by decreasing access to more recreational areas in these cover types undergoing treatments during treatment and recovery periods than Alternative A. Dispersed recreational activities could be adversely affected through decreased access to treated areas. Beneficial effects would be similar to those described in Section 4.10.2.

Alternative B would maintain 17 percent of the District in FRCC 3, 62 percent of the District would be moved toward FRCC 2, and 21 percent would be moved toward FRCC 1 over a 30-year period. Maintaining the District in these proportions would decrease the areas in FRCC 3 and increase the areas in FRCC 1 when compared to Alternative A. This alternative would reduce the potential for exploitation of game or livestock trails by OHV users, unmanaged exploration of exposed lava caves and tubes, limited access to recreational areas, and the loss of recreational facilities to large, frequent, and severe wildland fires when compared to Alternative A. The long-term, beneficial effects of this alternative would be to move these cover types toward improved FRCCs, thus lowering the potential for destruction of recreational resources by wildland fire.

4.10.5 ALTERNATIVE C

Alternative C would result in more total annual vegetation treatments in all cover types than any of the other alternatives (1,686,600 acres). This alternative would have direct impacts on recreational opportunities by decreasing access to more recreational areas in these cover types during treatment and recovery periods than for any of the other alternatives. Dispersed recreation, such as hunting and all-terrain vehicle riding, could be adversely affected through decreased access to treated areas. Beneficial effects would be similar to those described in Section 4.10.2.

Alternative C would move the most cover types in the District toward FRCC 1 or 2 over a 30-year period. This alternative would reduce the potential for exploitation of game trails by OHV users, unmanaged exploration of exposed lava caves and tubes, limited access to recreational areas, and the loss of recreational facilities to large catastrophic wildland fires, when compared to Alternative B. Potential recreational opportunities would be produced through an increased diversity of cover types, greater scenic variety, and wildlife diversity.

4.10.6 ALTERNATIVE D

Alternative D would result in more total treatments of Annual Grass, Juniper, Low-elevation Shrub, Mid-elevation Shrub, Mountain Shrub, and Perennial Grass cover types (1,522,400 acres) than Alternative B. Dispersed recreation, such as hunting and all-terrain vehicle riding, could be adversely affected through decreased access to treated areas. Beneficial effects would be similar to those described in Section 4.10.2.

Alternative D have similar impacts on District-wide FRCC as Alternative C. Impacts to game trails and livestock trails by OHV users, the exposure of hidden lava cave and tube entrances, and the loss of recreational facilities would be less than Alternative B, but still subject to a moderate potential for wildland fire (at FRCC 2). Mountain Shrub cover types would be moved toward FRCC 1, and would have a low potential for frequent wildland fire (and exposure) of

game trails, livestock trails, and lava tubes and caves. Juniper cover types, moved toward FRCC 2, would be more susceptible to wildland fire (and exposure of hidden trails and recreational resources) than Alternative B because of the long-term maintenance of this cover type at a higher FRCC (FRCC 2). The high potential for wildland fires in other cover types could cause additional exploitation of exposed game trails and livestock trails by OHV users, exposure of previously hidden lava caves and tubes to unmanaged exploration, limit access to recreational areas, and cause the loss of recreational facilities in these other cover types. Beneficial, long-term effects would be to move cover types toward improved FRCCs, thus lowering the potential for destruction of recreational resources by wildland fire.

4.10.7 Mitigation and Monitoring

Refer to Section 2.4.3.3, Fire Management Restrictions for management restrictions common to all alternatives. These restrictions would be implemented to avoid adverse impacts to recreation resources.

4.10.8 Unavoidable Adverse Impacts

There would be no unavoidable adverse impacts to recreational resources if management restrictions are implemented effectively.

4.10.9 Irretrievable and Irreversible Commitment of Resources

There would be no irretrievable or irreversible impacts to recreational resources if management restrictions are implemented effectively.

4.10.10 Cumulative Effects

The cumulative impacts of other fire management efforts on recreational resources within the District and on lands adjacent to the District would be beneficial. The additional reduction in wildland fire potential from these efforts would further reduce the potential for wildland fire-caused impacts on recreational resources within the District, particularly in the vicinity of Wildland Urban Interface areas. These efforts would also create additional improvements in habitat that would enhance recreational opportunities within the District by reducing areas infested with noxious weeds, by creating cover type diversity, and improving scenic quality.

4.11 ANALYSIS OF EFFECTS ON WILDERNESS RESOURCES

4.11.1 Analysis Assumptions and Methods

WSAs are managed to preserve their wilderness values according to the Interim Management Policy for Lands Under Wilderness Review (BLM Handbook 8550-1). In general, WSAs must be managed in a manner so as not to impair their suitability for preservation as wilderness. Fire management activities for WSAs are described in final wilderness management plans prepared for individual WSAs. Nonetheless, pertaining to this EIS, there are two objectives for fire management in WSAs. These are 1) permit lightning caused fires to play, as nearly as possible, their natural ecological role within wilderness, and 2) reduce, to an acceptable level, the risks and consequences of wildland fire within wilderness or escaping from wilderness.

The indicator used for the analysis is whether or not treatments would result in enhancing or preserving wilderness values. An assumption made for this analysis is that treatments would occur within or in the vicinity of WSAs for effects to be positive for WSAs, and occur on days

when climatic conditions favor the application of a given treatment type. It is also assumed that suppression efforts would be used sparsely under the action alternatives in WSAs since one of the objectives is to restore fire to its natural role. Restrictions applied to Areas of Critical Environmental Concern (ACECs) may be similar to those imposed within WSAs, depending on the resources or hazards present within specific areas. Coordination with interested publics is required as part of the NEPA process for all subsequent fire management plans and projects affecting WSAs.

4.11.2 Effects Common to All Alternatives

4.11.2.1 Indirect and Direct Impacts of Prescribed Burn (RxFire)

RxFire could be used in WSAs. Thus, for all alternatives, burning to reduce fuel loads, restore more natural vegetation conditions, and prepare a WSA for additional treatment(s) would result in positive impacts by restoring cover types to better functioning ecosystems.

4.11.2.2 Indirect and Direct Impacts of Wildland Fire Use (WFU)

Effects as a result of implementing WFU would be similar to those described under RxFire, assuming similar burn locations, timing, and management objectives, since WFU meets one of the objectives for managing WSAs.

4.11.2.3 Indirect and Direct Impacts of Chemical Treatment

The use of chemicals within WSAs would be allowed, though the method of application and equipment used would be carefully planned. Chemical use would be carried out on a site-specific level according to manufactures guidelines and in conjunction with equipment allowed for use in WSAs so as to minimize impacts to WSA values such as more natural-looking landscapes.

4.11.2.4 Indirect and Direct Impacts of Mechanical Treatment

The use of earth-moving equipment within WSAs requires approval of the field office manager. In those cases where suppression is necessary, methods may include use of power tools, aircraft, motorboats, and motorized fire-fighting equipment, causing minimal impacts to suppress the wildland fire while retaining wilderness suitability.

4.11.2.5 Indirect and Direct Impacts of Seeding Treatment

Impacts from equipment used for seeding must be carefully planned to be the least intrusive necessary to obtain a successful seeding. The use of native species (seed mix does not include naturalized species) is required in WSAs. Seed could also be applied aerially, with or without a follow-up soil coverage treatment such as harrowing.

4.11.3 Alternative A

Effects of continuation under current direction of full wildland fire suppression would not have any discernible change from current conditions. WSAs that have Vegetated Rock/Lava cover types would receive chemical and seeding treatments. The remaining WSAs have a predominance of Low-elevation Shrub, Perennial Grass, and Annual Grass. Thus in WSAs where chemical, mechanical, and seeding treatments would be approved for use, public perception of wilderness values may also be temporarily displaced since it is generally thought that wilderness requires little or no management.

4.11.4 ALTERNATIVE B

Impacts to WSAs would be dependent upon which type(s) of treatments would be used for a cover type. Under Alternative B, treatments in Vegetated Rock/Lava (approximately 50 percent of the WSAs) would only include WFU. The remaining cover types that are within WSAs would receive, in general, 2.5 times more treatment than proposed for Alternative A. Wildland fire would probably leave visible areas of charring and alter the perceived wilderness conditions and values for the public, depending on the size and intensity of the fire. In WSAs where chemical, mechanical, and seeding treatments would be approved for use, public perception of wilderness values may also be temporarily displaced since it is generally thought that wilderness requires little or no management.

4.11.5 ALTERNATIVE C

Assuming that WSAs would be targeted for fuels reduction under this alternative, impacts anticipated under this alternative would similar to those under Alternative B for Vegetated Rock/Lava cover types. The remaining cover types that are within WSAs would receive, in general, 6.7 times more treatment than proposed for Alternative A and also have impacts similar to those discussed in Section 4.11.2.

4.11.6 ALTERNATIVE D

There are no treatment proposed in Vegetated Rock/Lava under this alternative; thus, there would be no impacts to WSAs with this cover type. Fire suppression, which would be technically used since there is no proposed WFU in Vegetated Rock/Lava, is usually logistically difficult in this cover type. Impacts in Low-elevation Shrub, Perennial Grass, and Annual Grass would be approximately 6.7 times greater than those described under Alternative A.

4.11.7 MITIGATION AND MONITORING

Monitoring would be done in conjunction with the management restrictions common to all alternatives discussed in Chapter 2, Description of Alternatives. These restrictions would be implemented to avoid adverse impacts to WSAs.

4.11.8 UNAVOIDABLE ADVERSE IMPACTS

Under Alternative A, FRCC could worsen for some WSAs where no treatments occur. In these areas, wildland fire intensity, size, and duration would result in the deterioration of some of the values for which WSAs are managed. Under the action alternatives, there would be no unavoidable adverse impacts.

There is also the potential that restrictions on tools that are normally available throughout the District for vegetation and fire treatments may not be at the disposal of BLM managers for use in WSAs. As a consequence, FRCC may move towards 2 or 3 since permittable treatments may not be able to keep up with needed WSA vegetation and fire treatments.

4.11.9 IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES

Irretrievable impacts to WSAs would include the short-term loss of wilderness values due to mechanical noise and/or smoke during fire management activies. However, this short-term habitat loss would not be irreversible, as it would be cease upon cessation of these activities.

Additionally, the long-term values associated with WSAs in the District would benefit from the proposed increased fire management activities.

4.11.10 CUMULATIVE EFFECTS

Cumulative impacts to WSAs and wilderness would be related to management activities of other agency planning efforts where there are WSAs or wilderness are adjacent to areas targeted by the agencies.

The Caribou-Targhee National Forest Plan includes treating a total of 90,000 acres over the next 10-years (approximately 3 times the current and past treatment rates). These future fire management activities would likely have a cumulatively positive impact on the existing cover types in the District and in southeastern Idaho, and therefore on WSAs that are located in the vicinity of these forests.

As cumulative effects relate to this EIS, Alternative A and Alternative D treat less acreage in the Vegetated Rock/Lava cover type as opposed Alternatives B and C. Nonetheless, it would be expected that overall cumulative impacts resulting from the implementation of one of the action alternatives would have positive impacts on WSAs.

4.12 ANALYSIS OF EFFECTS ON VISUAL RESOURCES

4.12.1 ANALYSIS ASSUMPTIONS AND METHODS

The analysis assumptions for visual resources were that: 1) remote areas in the District would not be areas of high visibility to the general public; 2) steep-sloped areas along major roadways in the District would be areas that are highly visible to the public; 3) vegetation treatment in the vicinity of recreational and/or highly urbanized areas would be highly visible to the public; and 4) standard BLM visual analysis methods of contrast analysis from representative points of view within the District would be the most effective way to analyze the effects of fire treatment on the District's visual resources.

As described in Section 3.12, Visual Resources, the BLM uses the VRM system and the four VRM classes to analyze and to determine the visual impacts of proposed activities on the land and to gauge the level of disturbance an area can tolerate before it exceeds the visual objectives of each VRM class. The method that the BLM uses to determine whether proposed projects conform to an area's VRM class objectives is a contrast rating system that evaluates the effects of proposed projects on visual resources.

Contrast rating is done from critical viewpoints, known as Key Observation Points (KOPs), which are usually along commonly traveled routes or other points of view visible to people. A KOP can either be a single point of view that an observer/evaluator uses to rate an area or panorama, or a KOP can be a linear view along a roadway, trail, or river corridor. Factors considered in selecting KOPs are: the angle of observation or slope of the proposed project area, the number of viewers of the project area, the length of time that the project is in view, the relative size of the project, the season of use, and light conditions. A contrast rating can then be performed to determine whether or not the level of disturbance associated with the proposed project would exceed the VRM objectives for that area.

The primary views of fire suppression, RxFires, and prescribed vegetation treatments described in the alternatives would be from major travel routes, urban/public land boundary areas, and

recreational use areas within the District. Key Observation Points were selected to represent the effects of vegetation treatment on these areas. These areas were chosen using the selection criteria described above. Each of the KOPs is described in detail in Section 3.12, Visual Resources.

4.12.2 EFFECTS COMMON TO ALL ALTERNATIVES

The effects that fire management would have on visual resources within the District are based on the impacts produced by: 1) maintaining cover types in FRCC 3, 2, and 1; and 2) moving cover types from FRCC 3 toward FRCC 2 or FRCC 1. The methods by which these cover types would be shifted are: WFU (naturally occurring, yet planned or controlled, wildland fires); RxFire; chemical treatments using herbicides to control highly flammable invasive or noxious weeds; mechanical treatments, using a variety of mowing, chaining, chopping, or chainsaw techniques, to control undesirable plant species and reduce vegetation fuel levels; and seeding (drill-seeding or broadcast seeding).

These various methods for improving cover types and reducing fuel levels would be expected to have two primary effects on visual resources. First, smoke produced by planned wildland burning and RxFire would increase atmospheric particulate matter (measured as PM10), which could produce regional haze and reduce local visibility. The exposure after fire treatment of the District's generally fine, loess-type soil, to typical summer convection winds could produce dust storms (particularly in the District's lower elevation areas) that reduce visibility. This reduction in visibility could degrade scenic quality within the District. Second, the mechanical, chemical, burning, and seeding treatments would have direct and indirect effects on the existing visual contrasts of the landscape. Burning and/or chemically and mechanically removing vegetation, and seeding could produce direct effects that would alter the color, textural form, and linear attributes of the existing landscape. Indirect effects could be produced by fences or barriers used to exclude livestock from the treated areas, which could also alter the color, line, form, and texture of the landscape.

In general, the concentration of fire-produced PM_{10} would depend upon the type of vegetation being burned and the size of the burn area. Per pound, wood burning produces more particulate matter than burning leaves and grass. Wood fires also emit nitrous oxides and volatile organic compounds that are the precursors to ozone and smog. The quantity of smoke produced by RxFires or controlled wildland fires also depends upon the number of acres burned (i.e., large fires would produce more smoke than small fires). The type of fire produced also affects the quantity of particulates (i.e., RxFire typically produces fewer emissions than wildland fires, and surface fires typically produce fewer emissions that crown fires [USDA Forest Service 2002g]).

4.12.2.1 Direct and Indirect Impacts

4.12.2.1.1 Prescribed Burn (RxFire)

For all of the alternatives, when RxFires are used to move cover types toward FRCC 2 and FRCC 1, the smoke and burned areas would produce some visual quality degradation. This degradation from particulates and from landscape visual contrasts would have minor effects because of the relatively small size and low intensity of the RxFires. Particulates would dissipate and vegetation in burned areas would eventually reestablish.

4.12.2.1.2 Wildland Fire Use (WFU)

Impacts to visual resources as a result of implementing WFU would be similar to those described under RxFire, assuming the timing and location of wildland fire is similar to where an RxFire would meet the same objectives.

4.12.2.1.3 Chemical Treatment

For all the alternatives, the use of chemical treatments would have minor effects on visual quality. Color contrasts could be visible between treated and untreated areas in exotic Annual Grass cover types in the spring, but for most of the year the effects of treatment would be visually consistent with normal grass curing.

4.12.2.1.4 Mechanical Treatment

Mechanical treatments, using a variety of mowing, chaining, chopping, or hand-tool techniques, could affect visual quality, but the effects would depend upon the type of treatment. Mowing would tend to have minor effects on visual quality by producing some contrast between treated and untreated areas. Chopping and hand-tool treatments could produce color, texture, and linear contrasts between treated and untreated areas, but the effects would generally be minor when viewed within the middleground or background, where existing vegetation would screen the effects. Chaining treatments in juniper encroachment cover types could produce adverse changes in visual quality if conducted in highly visible areas (e.g., along roadways, within the viewshed of recreation areas, or on steep slopes). Chaining-treated areas would tend to produce strong textural, linear, and form contrasts with surrounding untreated areas when viewed in the foreground and middleground, but these contrasts would tend to diminish when viewed from a distance.

The effects of fire suppression on visual resources, for all of the alternatives, would vary, depending upon the methods used for suppression. The application of fire retardant on the landscape could produce minor adverse visual contrasts because of its bright color, but these effects would dissipate relatively quickly. Access to burned areas and areas in the vicinity of dozer lines and firebreaks would be restricted, which would result in minor, beneficial effects by reducing further impacts.

Fire suppression-related construction of firelines, firebreaks, dozer lines, and access roads for fire crews and equipment could produce both beneficial and adverse impacts on visual resources within the District. Positive effects on visual resources would be produced by the preservation of vegetation not intended for fire treatment. Negative effects would be the potentially strong linear, color, textural, and form contrasts produced by the creation of highly disturbed strips of land denuded of vegetation. If not effectively rehabilitated, these fire-suppression features could remain as visual impacts into the future.

4.12.2.1.5 Seeding Treatment

The effects of seeding treated areas would vary. Aerial broadcast seeding, followed by harrowing or chaining, would tend to produce minor soil surface disturbances that could create texture and color contrasts. These contrasts would tend to dissipate after vegetation re-growth.

Drill reseeding could produce minor adverse and beneficial effects. Adverse, textural and linear visual effects could be produced by drill row surface soil disturbances. Beneficial effects of drill seeding would be produced by the introduction of vegetation that either contributes to cover type

diversity or mimics the structure of the surrounding native cover type. If not effectively mitigated, these soil surface disturbances could remain as minor adverse impacts on visual quality into the future.

4.12.2.2 Fire Regime Condition Class (FRCC)

Under FRCC 1, historical fire patterns have been restored to cover types. Vegetation composition and structure, and vegetation fuel loads have been restored to historical levels and are within historical ranges of variability. Thus, fuel loads are relatively light and the risk of frequent, large-scale catastrophic wildland fires is low. Smoke production would be low in volume and would have minor impacts on visual quality. Visual contrasts within the landscape, produced by fires, would be minor since the severity of wildland fire would be low and reintroduced native plant species (adapted to historical fire patterns) would quickly recover.

FRCC 3 describes the condition at which much of the cover types within the District are presently classified. Under this FRCC, vegetation composition, structure, and fuel loads have been greatly altered from historical fire patterns and cycles. The potential for the production of instantaneous high volumes of smoke from large-scale catastrophic wildland fires is high. FRCC 3 also describes cover types that could produce major visual contrasts within the landscape from large-scale scorching of the landscape. Scorching would create highly visible contrasts within the landscape by altering the natural "elements" of the landscape (i.e., line, form, color, and texture).

FRCC 2 describes cover types that have been moderately removed from historical fire patterns and cycles. Vegetation composition, structure, and fuel loads have a moderate potential for producing catastrophic wildland fires. Smoke production and landscape scorching would be moderate because fuel loads, vegetation density, and vegetation composition would be at a moderate variance from historical fire conditions. Thus, with lower fuel loads and smaller, less frequent wildland fires, the effects on visual quality from atmospheric particulate matter and landscape scorching would be moderate.

For all of the alternatives, moving areas toward FRCC 2 and FRCC 1 cover types would produce positive visual effects. In general, "areas with the most scenic variety and harmonious composition have the most scenic value" (BLM 1986). By restoring a diversity of cover types at different stages of succession, scenic variety would be enhanced.

4.12.3 ALTERNATIVE A

4.12.3.1 KOP 1: Pocatello Creek Urban Boundary

Under Alternative A, there would be no (0) WFU-treated acres and 36,590 acres within the District treated as RxFire. The estimated PM_{10} combined concentrations, produced by RxFire under this alternative would be approximately 1,158 lbs/acre for Dry Conifer, Juniper/Pinion Mixed Conifer, Mid-elevation Shrub, and Mountain Shrub cover types (Trinity 2003). An indirect effect of this fire management regime would be to increase the risk of visual degradation from fires burning across public land boundaries onto private lands within the Pocatello Creek drainage. Scorching would create highly visible landscape contrasts by altering the visual "elements" of the landscape (i.e., line, color, and texture). Burning would produce distinct linear contrasts at the boundaries between burned and unburned areas. Texture and color contrasts would be visible between burned and unburned areas; unburned areas would maintain their present diversity of textures and colors, while burned areas would present a relatively uniform dark color and fine texture.

The estimated PM_{10} concentration from Low-elevation Shrub would be approximately 14 lbs/acre. There would be a potential for the moderate, indirect, negative effect of RxFire burning onto private lands within the Pocatello Creek drainage. The contrast effects of burned and unburned areas would be similar to those described above. Under Alternative A, this KOP is not likely to have seeding treatments or chemical treatments other than noxious weed control.

The impacts of Alternative A would be to maintain the Mid-elevation Shrub cover types under conditions that allow frequent, large-scale wildland fires to burn, with continued expansion of non-native, exotic species. Under FRCC 3, the potential for long-duration smoke production and the potential for frequent, high-intensity, large-scale catastrophic fires would remain high. This would result in the potential for major visual quality degradation from atmospheric particulates and large-scale landscape scorching as seen from this viewpoint. Scorching would create highly visible landscape contrasts by altering the visual "elements" of the landscape (i.e., line, color, and texture). Burning would produce distinct linear contrasts at the boundaries between burned and unburned areas. Textural and color contrasts would be visible between burned and unburned areas; unburned areas would maintain their present diversity of textures and colors, while burned areas would present a relatively uniform dark color and fine texture.

FRCC 3 would be maintained for all cover types in the area with the exception of Riparian and Salt Desert Shrub, producing fire conditions that could result in frequent, large-scale catastrophic wildland fires. There would be the potential for major, degradation of visual quality caused by atmospheric particulates, and burned-landscape contrasts that would affect linear, textural, and color attributes.

4.12.3.2 KOP 2: Appendicitis Hill Wilderness Study Area (WSA)

As described for Pocatello Creek KOP, the estimated treatment-acres for this alternative would include no (0) acres for WFU treatment and 36,590 acres for RxFire. Similarly, the Low-elevation Shrub cover types would have the potential for producing moderate visual quality-degrading atmospheric particulates and burnt-landscape contrasts. Textural contrasts produced by fire would be minimal, but color and linear contrasts between burned and unburned areas would be distinct. If untreated, the Mid-elevation Shrub cover types would have the potential for producing frequent, high-intensity fires, with a corresponding production of major, negative effects on visual quality from smoke and landscape contrasts within burned areas. Under Alternative A, this KOP is not likely to have seeding treatments or chemical treatments other than noxious weed control, so the effects to visual quality from these activities would be minimal.

Effects of Alternative A would be similar to those for the KOP1 Pocatello Creek Urban Boundary: allowing the Low- and Mid-elevation Shrub cover types to return to or remain at FRCC 3. Effects would be to maintain Mid-elevation Shrub at FRCC 3 and restore the Low-elevation Shrub cover types to FRCC 2. Similarly, the Low-elevation Shrub cover types under FRCC 2 would have the potential for producing moderate visual quality-degrading atmospheric particulates and burnt-landscape contrasts. Textural contrasts produced by fire would be minimal, but color and linear contrasts between burned and unburned areas would be distinct. The Mid-elevation Shrub cover types, maintained at FRCC 3, would have the potential for producing frequent, high-intensity, large-scale catastrophic wildland fires, with a corresponding production of major, negative effects on visual quality from smoke and landscape contrasts within burned areas. These conditions would degrade visual quality caused by atmospheric

particulates, and a burned landscape with linear and color contrasts. Under Alternative A, this KOP is not likely to have seeding treatments or chemical treatments, other than noxious weed control.

4.12.3.3 KOP 3: Ohio Gulch

The estimated treatment-acres for this alternative would include no (0) acres for WFU treatment and 36,590 acres for RxFire. The effects of treating the Mid-elevation Shrub cover types in Ohio Gulch would be similar to the effects for the KOP1 Pocatello Creek Urban Boundary. RxFire would create highly visible contrasts within the landscape by altering the natural visual elements of the landscape, particularly the linear, color, and textural attributes of the landscape. Distinct lines would be visible at the boundaries between unburned and burned areas, color contrasts would be obvious between burned and unburned vegetation, and the diversity of textures within vegetated areas would be clearly contrasted with the relatively homogeneous texture produced by burning. Under Alternative A, this KOP is not likely to have seeding treatments or chemical treatments other than noxious weed control.

The effects of maintaining the current fire management regime of FRCC 3 for the Mid-elevation Shrub cover types in Ohio Gulch would be similar to the effects for the KOP1 Pocatello Creek Urban Boundary. Under FRCC 3, there would be the potential for frequent, long-duration smoke production and the potential for high-intensity, large-scale catastrophic fires would remain high. This would result in the potential for major negative visual quality degradation effects from atmospheric particulates and landscape scorching. Scorching would create highly visible contrasts within the landscape by altering the natural visual elements of the landscape, particularly the linear, color, and textural attributes of the landscape. Distinct lines would be visible at the boundaries between unburned and burned areas, color contrasts would be obvious between burned and unburned vegetation, and the diversity of textures within vegetated areas would be clearly contrasted with the relatively homogeneous texture produced by burning. Under Alternative A, this KOP is not likely to have seeding treatments or chemical treatments, other than noxious weed control.

4.12.4 ALTERNATIVE B

4.12.4.1 KOP 1: Pocatello Creek Urban Boundary

Under this alternative, WFU treatments would total 112,180 acres and RxFire treatments would total 356,000 acres. The combined PM10 concentrations produced by RxFire and WFU within these cover types would be approximately 289 lbs/acre. Mountain Shrub cover types would have the potential for producing moderately visual-quality degrading smoke; however the effects on color, texture, and line would be similar to those for Alternative A.

There would be some adverse changes in landscape color and texture landscape contrasts if fire was used as a treatment, but these would be minor. Mechanical treatments would produce similar minor changes in landscape contrasts. Under this alternative, no chemical treatments are likely except noxious weed control.

Under Alternative B, FRCC 3 would be maintained for Low- and Mid-elevation Shrub, Annual and Perennial Grass, Salt Desert Shrub, and Wet Conifer cover types. Similar to Alternative A, this would maintain fire conditions that have a potential for frequent, large-scale catastrophic wildland fire, resulting in the potential for major visual quality degradation from atmospheric

particulates and large-scale landscape scorching. Landscape scorching would produce linear, textural, and color effects similar to those described previously.

Mountain Shrub, Dry Conifer, and Juniper cover types would be moved toward FRCC 1. This would create fire conditions by which there would be the potential for minor visual degradation from atmospheric particulates and landscape burns. Some color, line, and texture contrasts would be visible in the shrub cover type, but the effects of burning in the juniper and dry Conifer cover types would be minor and not obvious to the casual viewer. The effects of chemical treatments in the Mountain Shrub, Dry Conifer, and Juniper cover types would also be minor, and not obvious to the casual viewer. The effects of mechanical treatment would vary, depending upon the methods used. The potential for the indirect negative effects of catastrophic wildland fires moving onto private lands would also be reduced.

4.12.4.2 KOP 2: Appendicitis Hill Wilderness Study Area (WSA)

The WFU and RxFire treatment-acres would be the same as described for KOP1. The estimated PM_{10} concentration would be approximately 28 lbs/acre from RxFire and WFU treatments for these two cover types, producing the potential for scenic-quality reducing haze. The effects of fire on line, color, and texture would be apparent from the distinct contrasts between burned and unburned areas. The boundaries between burned and unburned areas would form highly visible lines on the slopes of the WSA, easily seen from the highway. The color contrast between burned and unburned areas would be distinct, and some minor contrasts in texture would be visible. Under this alternative, chemical treatments are unlikely. Any seeding, if done, would be aerial broadcast, producing minimal impacts on visual quality.

Under Alternative B, WFU-treated acres would total 112,180 and RxFire acres would total 356,000 acres within the District. Low- and Mid-elevation Shrub would remain at FRCC 3, with the corresponding risks of frequent, large-scale catastrophic wildland fire. The impacts would be similar to those given for the impacts under Alternative A.

4.12.4.3 KOP 3: Ohio Gulch

The estimated PM_{10} concentration produced by this vegetation would be approximately 14 lbs/acre from WFU and RxFires, with the same WFU and RxFire acreages as described above. The effects would be similar to those described in Section 4.12.3.3 for Mid-elevation Shrub. Smoke particulates produced by RxFire and WFU fire treatments would create the potential for haze, and areas of burned vegetation would create distinct contrasts in color, line, and texture with unburned vegetation. Under this alternative, chemical treatments are unlikely except for some noxious weed control.

With the same WFU and prescribe treatment-acres as described above, the effects of Alternative B would be that Mid-elevation Shrub cover types would remain at FRCC 3. The impacts would be similar to Alternative A impacts (see Section 4.12.3.3).

4.12.5 ALTERNATIVE C

4.12.5.1 KOP 1: Pocatello Creek Urban Boundary

Under this alternative, the District would treat 129,518 acres under WFU and 1,034,603 acres under RxFire. Compared to both Alternative A and Alternative B, more acres would be treated with RxFire and WFU. Chemical treatments would produce minor changes in visual elements between treated and untreated areas. The effects of mechanical treatments would vary, depending

upon the types of treatments used. This alternative would create the potential for moderate visual quality degradation from wildland fire, as seen from this KOP, because the potential for smoke production would be greater and the number of treatment-acres is greater when compared to Alternative A and Alternative B. Some adverse landscape contrasts in color, line, and texture could be visible.

Alternative C would reduce the potential for visual quality degradation from all cover types to a minimal or very limited level (at FRCC 1). The behavior, severity, and patterns of FRCC 1 would create the potential for producing only minor or limited visual quality degradation effects from fire-produced atmospheric particulates. Landscape contrasts from visibly burned areas would not be apparent. The indirect impacts of wildland fire crossing into urban areas would also be minor or limited.

4.12.5.2 KOP 2: Appendicitis Hill Wilderness Study Area (WSA)

The impacts under this alternative would be similar to those impacts described for Low-elevation Shrub cover types under Alternative A. The relatively large number of treatment-acres under this alternative could reduce visual quality. Some adverse landscape contrasts in color, line, and texture could be visible, but impacts from mechanical treatments would be minimal within the WSA.

Overall impacts of this alternative, resulting from moving the Low- and Mid-elevation Shrub cover types toward FRCC 1, would be similar to the impacts for the KOP1 Pocatello Creek Urban Boundary described above. By recreating historical fire patterns, characteristics, and levels of severity there would be only minor or very limited visual quality degradation from fire-produced atmospheric particulates and landscape line, color, and texture contrasts between burned and unburned areas.

4.12.5.3 KOP 3: Ohio Gulch

The impacts of this alternative would be similar to those described for KOP2 Appendicitis Hill WSA above.

The impacts of moving Mid-elevation Shrub cover types toward FRCC 1 would be similar to those described for KOP2 Appendicitis Hill WSA above.

4.12.6 ALTERNATIVE D

4.12.6.1 KOP 1: Pocatello Creek Urban Boundary

Under this alternative, WFU-treated acres would total 14,800 acres and RxFire acres would total 676,515 acres. Alternative D would treat approximately 639,925 more acres by RxFire and 14,800 more acres for WFU compared to Alternative A. Alternative D would treat more acres by RxFire, but less by WFU as compared to Alternative B. The effects on visual resources would be similar to those described for this area under Alternative C above.

Alternative D would maintain the potential for visual quality degradation from smoke and landscape contrasts at a moderate to major level for all cover types, except Mountain Shrub and Vegetated Rock/Lava cover types. This alternative would maintain Dry Conifer cover types at FRCC 3, move Juniper and Mid-elevation Shrub toward FRCC 2, and move Mountain Shrub cover types toward FRCC 1.

Dry Conifer cover types would have the potential to produce major negative effects on visual quality from high concentrations of fire-produced PM10 and strong visual contrasts in color, texture, and line within the landscape between burned and unburned areas. Juniper and Mid-elevation Shrub cover types would have the potential for moderate degradation of visual quality by smoke particulates from wildland fire, but the effects on visual quality between burned and unburned areas would not be obvious to the casual viewer. Mountain Shrub cover types, moved toward FRCC 1, would have the potential for minor or limited effects on visual quality.

4.12.6.2 KOP 2: Appendicitis Hill Wilderness Study Area (WSA)

The effects of this alternative would be similar to those described for this area under Alternative C, above (see Section 4.12.5.2).

Maintenance of the Low-elevation Shrub cover type in FRCC 3 would have the potential for major, negative effects on visual quality, similar to the effects described for Alternative A. The effects of moving Mid-elevation Shrub cover types toward FRCC 2 would be similar to those described for the Pocatello Creek Urban Boundary above.

4.12.6.3 KOP 3: Ohio Gulch

The effects of this alternative would be similar to those described for this area under Alternative C, above (see Section 4.12.5.3).

The effects of this alternative, by moving Mid-elevation Shrub cover types toward FRCC 2, would be to reduce the potential for visual quality degradation from smoke-produced particulates and landscape visual contrasts to a moderate level. The effects of burn-produced contrasts in line, color, and texture on the landscape would not be obvious to the casual viewer.

4.12.7 Mitigation and Monitoring

Refer to Section 2.4.3.3, Fire Management Restrictions for management restrictions common to all alternatives intended to prevent significant impacts to visual resources.

4.12.8 Unavoidable Adverse Impacts

There would be unavoidably adverse impacts to visual resources associated with RxFire, chemical, and mechanical fire treatments. The unavoidable adverse impacts would include: 1) atmospheric pollution from smoke particulates (PM_{10}) and indirect impacts from wind-blown soil; 2) heightened visual contrasts between burned and unburned areas; and 3) visual contrasts caused by the loss of vegetation or by disturbed soil from mechanical and chemical treatments, and drill seeding.

4.12.9 Irretrievable and Irreversible Commitment of Resources

Irretrievable impacts to visual resources would include the short-term impacts from smoke particulates and wind blown soil, visual contrasts between burned and unburned areas, and visual contrasts associated with the loss of vegetation and disturbed soil. However, this short-term loss in visual resources would not be irreversible, as it would be restored through implementation of a rehabilitation and restoration program as described in Chapter 2.

4.12.10 Cumulative Effects

Other fire management efforts, both within the District and beyond its boundaries would produce beneficial cumulative impacts on visual resources. Reasonably foreseeable future actions,

including planning efforts to control noxious weeds, OHV use, fire treatments, and habitat improvement projects would contribute to improvements in visual quality.

Specific actions that could potentially have beneficial cumulative effects include: USFS RxFires to reduce fuel loads and improve habitat in the Caribou-Targhee, and Sawtooth National Forests; INEEL management plan changes; and the Idaho statewide implementation plan that focuses on fire management and fuel load reductions. These efforts, in addition to the District effort to manage wildland fire, are expected to reduce the impacts on visual resources by reducing the potential for wildland fire, recreating historical fire conditions, and creating scenic diversity.

4.13 ANALYSIS OF EFFECTS ON CULTURAL RESOURCES

4.13.1 ANALYSIS ASSUMPTIONS AND METHODS

Approximately 9,100 archaeological sites and historical properties have been documented in the District, many more have not yet been documented through formal inventory and recordation. Consequently, the specific effects of implementing the one of the action alternatives on all individual sites are, to some degree, unknown at this time. This analysis is based on estimates of the number, type, and significance of archaeological and historical sites provided by cultural resource inventories for approximately 5 percent of the planning area. Furthermore, all specific federally funded or licensed projects on BLM-administered land are subject to review under Section 106 of the NHPA (36CFR800). As part of this review process, cultural resources are identified on the ground prior to any action, and mitigation strategies are developed. Overall, certain generalities exist as to the impacts of wildland fire and fire management on given types of cultural resources, and as such, this information can be used to predict how implementation of this EIS is likely to affect resources in the District.

The various impacts mentioned above consist of a wide range of possible effects of WFU, RxFire, and other vegetation treatments. For the purpose of this analysis, it is assumed that the worse impacts to cultural resources would occur in cover types that are presently in or moving towards FRCC 2 or 3. This is because higher severity fires, larger fires, and loss of ecosystem components are assumed to create detrimental effects on cultural resources presently in the natural environment.

4.13.2 EFFECTS COMMON TO ALL ALTERNATIVES

4.13.2.1 Direct and Indirect Impacts

4.13.2.1.1 Prescribed Burn (RxFire)

Cover types treated with RxFire provide several opportunities for cultural resources management. While fire can have a substantial negative impact on some cultural resources, it can have a positive effect on others. For example, the removal of ground cover or thick stands of vegetation can expose previously unknown archaeological sites for identification, documentation, and study, providing land managers an opportunity to expand their understanding of the locations and types of cultural resources within their jurisdiction. However, depending on the stability of the soils in which a cultural site is located, loss of vegetative ground cover can also result in increased levels of erosion through wind scouring and runoff. This erosion can deflate sites, causing the movement of artifacts away from their original locations and altering the accuracy of the information that can be obtained from studying artifacts in the primary context. Erosion can also scour features or cause standing structures to be undermined

and collapse. Erosion, however, can be controlled by replacement of vegetation through seeding. Effects of seeding are discussed below.

Increased unauthorized collection of artifact from archaeological sites (commonly called looting) is also a negative consequence of fire. Looting by the general public (the land users) may occur if they become aware of sites that are exposed to view by fires that reduce vegetative cover. Most looting is undertaken by people who are unaware that their activities are illegal and can often be controlled by educating the public about the various laws protecting cultural resource sites and the penalties for violating these laws.

Furthermore, the effects of fire on cultural resources are related to the severity of the fire. High temperature, slow burning fires cause far more damage to cultural materials than do cooler, faster burning fires. For this reason, RxFires, which typically do not exceed temperatures of 500° F and have a shorter "residence time" at any given location, are likely to cause less damage to archaeological resources than uncontrolled, hotter unwanted wildland fires that may burn and smolder on a site for longer periods of time. Thus, effective fire management may enhance the site rather than damage it.

While RxFire would be conducted under controlled circumstances, and the BLM will have an opportunity through Section 106 to identify sites in the planning area, there remains some risk to cultural resources. This risk is related to the possibility of RxFire not behaving within its planned prescription. If that occurs, historic structures could be directly affected by RxFire and buried undiscovered sites could be impacted by the construction of fire control lines.

4.13.2.1.2 Wildland Fire Use (WFU)

In general, the effect of fire on cultural resources is directly correlated with the nature of the resource and the severity and duration of the fire. The location and timing of wildland fires are generally unpredictable. Finally, activities specifically geared to controlling and/or suppressing wild fire can affect cultural resources more so than activities to control an RxFire.

Prior to the severe fire seasons of the past eight years, the effects of unwanted wildland fire, RxFire, and other vegetation treatments on cultural resources were given little attention, except during ground disturbing rehabilitation efforts. Since that time, designed experiments and concerted post-fire assessments are being carried out by both land management agencies and private researchers alike to assess the effect of fire on these non-renewable resources. From this research has come a wealth of information that can assist the BLM in balancing the management of fire, fuels, and related vegetation with those of federal cultural resources legislation. The critical conclusion of the on-going research is that land managers need to understand the effects of fire on particular types of cultural materials in order to implement a fire management policy that avoids unnecessary loss of heritage resources. In general, the effect of fire on cultural resources is directly correlated with the nature of the resource, as well as the severity and duration of the fire.

Archaeological sites, regardless of type or age, consist of a collection of culturally modified materials. Surface artifacts are more susceptible to damage than are subsurface artifacts, though the latter can also be affected if soil temperatures get too high.

While the destruction of artifacts eliminates the types of information that can be obtained from archaeological sites and may reduce or eliminate the cultural use values of sites, even mild heat-related changes in artifacts caused by exposure to fire can significantly alter the accuracy of

certain scientific studies that are used to refine our understanding of past human behaviors and to help land managers assess the importance of sites under their jurisdiction. In the following paragraphs, effects of fire, namely higher severity fires, are examined relative to different artifact and material classes.

Studies that are used to assign ages to sites and artifacts can be affected by changes that occur as a result of heat exposure. Tree ring dating, a technique that utilizes measurements and comparisons of tree rings from ancient wood recovered from archaeological sites, is often used to assign ages to sites and structures that have wooden beams and timbers incorporated into their construction. Opportunities for such studies can be eliminated by the consumption of such wood materials during a fire. Radiocarbon dating, a technique that utilizes measurements of organic carbon in materials such as wood in order to date archaeological sites, can also be affected by fire. Material samples used in the dating test can become contaminated with charcoal and ash from modern fires, thus providing erroneous dates. Fire at high temperatures can alter the moisture content of samples used in obsidian hydration studies. Because obsidian hydration is a dating technique that relies on the amount of water absorbed by obsidian stone tools and debris, high temperature fires can affect it. Fires with temperatures over 975° F can also alter clay in ancient hearth features and thus modify the accuracy of archeo-magnetic studies, a dating technique that is based on the assumption that clay was fired at a particular time. In sum, heat from intense fires can alter many of the samples and techniques that archaeologists use to date sites. Because the date that a site or a part of a site was occupied is a very important factor in using the information from the site to study the past, high severity fires can seriously affect archaeological sites.

Though somewhat more durable than other types of cultural materials, artifacts and structures composed of stone are also susceptible to damage by fire. In particular, stone objects exposed to fire with temperatures above 700° F are prone to substantial damage including cracking, shattering, smudging, spalling, and oxidizing (Hanes 2001). Stone objects subjected to fire with temperatures below 500° F suffered far fewer damaging effects.

The damage caused by exposure to high severity heat can result in the complete loss of cultural artifacts and sites. Masonry structures exposed to fire can crumble due to spalling of stone materials or the destruction of organic structural components such as timber beams and roof supports. Of particular concern for cultural resource managers is the impact that fire has on rock art panels. Rock art is especially susceptible to damage from fire with soot causing irreparable blackening of the panel and intense heat either consuming organic paints used in pictographs or causing the rock face (particularly if it is sandstone or limestone) to exfoliate (Hanes 2001).

Ceramic artifacts are also vulnerable to damage by fire. Although ceramic vessels are typically created by applying heat to the material in order to give them their clastic properties, subsequent fire can severely damage them. Under conditions of high severity and long duration, ceramic artifacts are essentially "re-fired" which can alter the chemical composition of the clays, oxidize certain elements, and destroy organic paints, decals, and transfer prints. Additionally, soot blackening can make identification of cultural affiliation or vessel maker (for historical items) impossible and can severely alter the accuracy of dating techniques and subsistence studies. In general; however, ceramic artifacts are somewhat more tolerant to the effects of fire than are other artifact classes. Substantial damage to ceramic items appears to occur with temperatures in excess of 925° F (Hanes 2001).

Historical ceramics are less likely to be severely damaged by exposure to wildland fire or RxFire than are prehistoric ceramics. This difference is due to the manufacture technique for each type of ceramic and the original temperatures at which the vessels are fired. Historical ceramics, particularly porcelains, are fired at temperatures often exceeding 1300° F. As such, substantial alteration of the materials is not likely to occur until temperatures once again exceed that level, which rarely occurs outside of a confined environment such as a kiln.

Understandably, cultural resources composed of organic materials such as bone, shell, wood, and plant fiber are among the most fragile of all archaeological resources. Not surprisingly then, they are also among the most rare items to be found in an archaeological setting and are among the most valuable from a scientific perspective. The fragile nature of organic artifacts makes them especially susceptible to damage and destruction by fire. In general, items composed of organic materials are irreparably damaged, if not completely destroyed, at very low temperatures of less than 300° F (Wiltz 2003). Plant materials can be entirely consumed, and if part of a structure, can cause the structure to collapse. Shell items, such as beads and pendants, can become highly fragile (Hanes 2001). Although the impact of fire on bone is only minimally understood, studies of beef bone found at the Custer's Battlefield site showed that, compared to metal and stone artifacts, bone fared very poorly (Hanes 2001).

In addition to artifacts intentionally crafted out of plant and animals materials, organic resources within an archaeological setting contribute important information about other aspects of history and prehistory. For example, paleoenvironmental studies and studies of subsistence practices are often based upon the analysis of plant pollens recovered either from soil samples or directly from artifacts. As organic material, these pollen grains are susceptible to damage by fire. Of particular note is that, in general, pollen grains are destroyed at temperatures above 600° F (Hanes 2001).

The overall effects of fire on inorganic materials, such as metal and glass, that are traditionally found at historical archaeological sites is not well understood. To date, no systematic studies have been reported identifying heat tolerance temperatures for items composed of these materials. However, it is known that glass items, such as bottles, buttons, and beads can be significantly altered through melting as a result of exposure to heat. This melting can obscure important temporally diagnostic characteristic such as mold seams, maker's marks, and product labels. The degree of susceptibility of any given glass artifact directly linked to the composition of the glass. The melting temperature varies depending on the type of flux material used in the manufacture of the glass. Some glass would melt at temperatures around 900° F while other won't melt until temperatures exceed 2000° F (Maharaj 2002).

It is also important to discuss the effects of fire suppression that may be related to aspects of fire use. Fire management and suppression activities can involve ground disturbances such as creation of firebreaks, roads, and staging areas with mechanical and hand operated equipment. These activities can break artifacts or damage features. Perhaps more importantly, they can move artifacts, architecture, and features out of their original spatial location, thus disturbing the information that archaeologists could gain from the spatial organization of archaeological sites.

Furthermore, there are ancillary effects of fire management that have been documented by recent studies. Two primary negative impacts associated with burning of any type, as discussed above, are erosion and looting (Hanes 2001). These impacts are discussed in more detail below.

4.13.2.1.3 Chemical Treatment

The chemical application of herbicides to control invasive species/noxious weeds during ES&R and restoration can also affect cultural resources. Although no studies have examined the specific effects of these types of activities on cultural resource sites, due to the straightforward nature of the activities it is possible to confidently postulate potential effects of these actions. The application of chemicals, as discussed in previous sections, has the potential to introduce corrosive effects to artifact classes and change the soil chemistry of cultural resource sites in ways that may reduce their potential to address certain research questions and provide certain classes of data. Currently, however, there are no studies that provide data on the effects of herbicides on archaeological sites and artifacts.

4.13.2.1.4 Mechanical Treatment

Mechanical activities can include, mowing, chaining, chopping, and cutting of surface vegetation, and application of seeds via rangeland drill. In general, the impacts from mechanical treatments on cultural resources are related to the physical disturbance of artifacts and features by the mechanical activities. During any ground disturbing activities, intact segments of linear sites such as historic trails and wagon roads, several of which are known to exist in the District, can be significantly altered or completely destroyed. Ground disturbance on non-linear archaeological sites can result in the breaking or displacing of artifacts from their original context. Subsurface features such as storage pits, burials, hearths, and the foundations of dwellings can be exposed and destroyed depending on the depth to which they are buried and the depth of ground disturbance by the heavy machinery. Even hand-operated tools such as picks and shovels can cause physical damage to cultural resource sites. These activities move artifacts, architecture, and features out of their original spatial locations. One of the major aspects of data that are contained in archaeological sites is the spatial relationship between artifacts, features, and any architecture. Indeed, the spatial relationships, which provide clues to the organization of activities on a site, the meanings of artifacts, etc., are at least as important to interpretation of the past as the artifacts themselves. Thus, mechanical disturbance of the ground and the concomitant disturbance of the spatial relationships between artifacts and features affect the information that archaeologists could gain from the spatial organization of archaeological sites. Depending on the nature of a given site, and the exact mechanical activities occurring at the site, the effects can range from mild to severe. Unfortunately, it is rarely possible to assess the subsurface spatial organization of a site from a surface examination. Thus, the exact effect of mechanical activities on any given site cannot be assessed without substantial testing and preliminary data collection.

Pre-treatment inventories for archaeological resources and consultation with Tribes can help to identify cultural resource sites in a proposed treatment area. Once such resources have been identified, treatment plans can be tailored to include avoidance measures, such as those outlined in Section 2.4.3.3, Fire Management Restrictions for historic trails.

4.13.2.1.5 Seeding Treatment

The introduction of seeds to cultural resource sites either aerially or via rangeland drill could potentially affect the ancient seeds and pollen found at cultural resource sites. Ancient seeds and pollen at archaeological sites provide valuable insights into past subsistence activities. Adding new seed classes or changing the proportions of classes via seeding activities could potentially alter the overall seed assemblage on a site and affect the paleobotanical dataset. The growth of the new plants as well can introduce new pollen into the sediments and affect the pollen data set

on a site. In many cases these effects may be minor—introduced seeds and pollen may be distinguishable in morphology or proportions from ancient seeds and pollen. However, in other cases and over the long term, the new introductions do have the potential to bias the archaeological record. Additional impacts to cultural resource sites from mechanical seeding (drilling) can include such things as the alteration or destruction of historic trails and roads. Because of these potential impacts, the BLM conducts pre-treatment inventories for archaeological resources to identify cultural resource sites in a proposed treatment area. Pre-treatment consultation with Tribes is also undertaken to identify resources of importance to the Tribes. Once such archaeological or tribal resources have been identified, treatment plans can be tailored to include avoidance measures, such as those outlined in Section 2.4.3.3, Fire Management Restrictions for historic trails.

4.13.3 ALTERNATIVE A

Under this alternative, impacts could occur as described above to different types of cultural resources. An estimated 250,200 footprint-acres could be subject to WFU, mechanical treatment, chemical treatment, RxFire, or seeding. Fires (either WFU or RxFire) would have a variety of effects on archaeological and historical sites and artifacts. Cultural resources on the untreated acres could be destroyed, damaged, or altered under this alternative. ES&R and restoration activities could also result in impacts to sites by either directly disturbing artifacts through ground disturbing activities or through the effects of chemicals on artifacts. However, as is discussed below under mitigation, standard BLM practice entails measures such as pre-action inventory and avoidance that would be likely to mitigate many of these impacts.

4.13.4 ALTERNATIVE B

Under Alternative B, it is estimated that approximately 646,200 footprint-acres in most cover types would be treated through WFU, RxFire, and/or other vegetation treatments. Although the location of many cultural resources is not known, it is likely that some resources could be impacted by treatment. Because it is generally the case that the likelihood of a site being present increases with the acreage under consideration, the increased footprint-acreage for Alternative B (relative to Alternative A) would be likely to result in an increased number of sites impacted. However, the relationship is not necessarily one-to-one; site distribution is related to many factors and not directly related to acres. Therefore, it is not possible to accurately estimate how many more sites would be affected. Fires (either RxFire or WFU) would have a variety of effects on archaeological and historical sites and artifacts. Restoration and ES&R activities could also result in impacts to sites by either directly disturbing artifacts through ground disturbing activities or through the effects of chemicals on artifacts. Resources could be uncovered through mechanical treatment, burned through the use of fire, or possibly damaged through the application of chemicals as discussed above. However, as is discussed below under mitigation, standard BLM practice entails measures such as pre-action inventory and avoidance that would be likely to mitigate many of these impacts.

4.13.5 ALTERNATIVE C

Under this alternative, it is estimated that approximately 1,686,600 footprint-acres would be treated through WFU, RxFire, and/or other vegetation treatments. Other cover types would also be treated, but to a lesser extent. Although the location of many cultural resources is not known, it is likely that some resources could be impacted by treatment. Because it is generally the case

that the likelihood of a site being present increases with the acreage under consideration, the increased footprint-acreage for Alternative C (relative to Alternative A or Alternative B) would be likely to result in an increased number of sites impacted. However, standard BLM practice entails measures such as pre-action inventory and avoidance that would be likely to mitigate many of these impacts.

4.13.6 ALTERNATIVE D

Under this alternative, it is estimated that approximately 1,522,400 footprint-acres in Low-elevation Shrub, Perennial Grass, and Annual Grass would be treated through WFU, RxFire, and/or other vegetation treatments. Similar to Alternative B, cultural resources could be uncovered through mechanical treatment, burned through the use of fire, or damaged through the application of chemicals. Because it is generally the case that the likelihood of a site being present increases with the acreage under consideration, the increased footprint-acreage for this alternative (relative to Alternative A or Alternative B) would be likely to result in an increased number of sites impacted. The acreage is similar to that proposed for Alternative C, and it is probable that the effects of this alternative would be similar to that of Alternative C. BLM standards for pre-treatment inventories and consultation under Section 106 of the NHPA apply and are effective in identifying resources and mitigating potential negative impacts under any given treatment alternative.

4.13.7 MITIGATION AND MONITORING

The BLM has formulated management restrictions to protect cultural resources during fire management activities. In addition to these guidelines, the BLM as a federal agency is required under Section 106 of the National Historic Preservation Act (NHPA) to identify archaeological and historical properties eligible for or listed on the National Register of Historic Places and to determine if these properties would be affected by a specific action. Standard BLM policy prior to planned actions such as RxFires, is to conduct a reconnaissance or judgmental survey within portions of proposed burn areas where existing data reviews suggest that flammable properties or resources that might be vulnerable to damage by fires of the severity and duration of the RxFires are present. These areas would then be avoided if possible. Standard policy prior to ES&R or restoration activities is to have a comprehensive field surface inventory of the area in question conducted by a qualified professional. Following identification of archaeological and historical sites visible on the surface, the sites are demarcated and then avoided if possible during ground disturbing or other ES&R/restoration activities

The site identification and avoidance procedure would mitigate many of the potential impacts described above for all of the alternatives. By identifying resources that may be affected by fire and then avoiding them during RxFires and ES&R/restoration activities, many of the negative effects from these activities would be mitigated. Additionally, the consultation process with Tribes would help identify opportunities to use proposed treatments to benefit cover types of importance to these groups.

However, because it is not possible to identify every potential cultural resource, particularly subsurface resources or resources obscured by vegetation during field inventories, it is not possible to completely avoid all cultural resources or guarantee that no impacts would occur. Fire suppression activities under wildland fire situations would also occur in a situation that does not easily allow for the identification of resources prior to conducting ground disturbing or other suppression activities. Currently there is no technology that could efficiently and confidently

identify all cultural resources on all acres of the land in question. Notably, however, wildland fires have been impacting these sites for thousands of years, and will continue to do so. The mitigation measures developed here have been established to provide the best feasible protection from the negative effects of rangeland fire, fire suppression, ES&R, and restoration activities to cultural resources.

4.13.8 Unavoidable Adverse Impacts

Unavoidable adverse impacts to cultural resources from implementation of any given alternative are predominantly related to the largely unpredictable effects of fire management actions. Section 106 of the NHPA and BLM guidelines require identification of cultural resources prior to all undertakings, as well as avoidance of known cultural resource sites. As such, for all components of the four alternatives that involve preventative treatments, pre-treatment inventories and consultation would be implemented to reduce to the greatest extent possible any adverse impacts on significant cultural resources. However, in cases of wildland fire, pre-treatment inventories and consultation are not likely to be possible. As a result, cultural resources located in areas subject wildland fire may be adversely impacted by either the fire itself or the means of controlling it.

Additional unavoidable adverse impacts are related to the nature of many archaeological sites. Although pre-treatment field inventory can often reveal many archaeological sites, and can often adequately characterize the sites once identified, because many archaeological sites are buried, and many parts of sites are buried, no inventory can identify 100 percent of all archaeological sites or other cultural resources in an area. Thus, for any fire situation or ES&R and restoration activity that is ground disturbing, it is possible that previously unidentified resources may be adversely impacted. Furthermore, it is possible that previously buried or otherwise unseen aspects of known resources could be inadvertently damaged during intense fire or ES&R and restoration activities.

4.13.9 Irretrievable and Irreversible Commitment of Resources

Some irretrievable impacts to cultural resources could occur if all archaeological sites are not located during pre-treatment inventories. These impacts could also be irreversible, particularly if WFU, RxFire, or mechanical treatments are used. These treatments all have the potential to completely destroy undetected cultural sites and associated objects. However, irreversible impacts to cultural resources would be minimized by pre-treatment surveys and full compliance with the Section 106 consultation process.

4.13.10 Cumulative Effects

Cumulative impacts to cultural resources are considered relative to the effects of the alternatives in relation to other similar plans. These similar plans include the Interior Columbia Basin Ecosystem Management Project, the INEEL management plan, the Sawtooth, Caribou, and Targhee National Forests management plans, and the Idaho Statewide Implementation Strategy for the National Fire Plan. Overall, the primary goals of these plans are to reduce the severity and duration of fires in the region. The means proposed to meet these goals are broadly similar to many proposed under various alternatives in this EIS, and include RxFires, WFU, ES&R and restoration activities.

As discussed above, damage to archaeological sites from fire predominantly relates to the severity and duration of the fire. High severity, stand-depleting burns would, in general, result in

increased damage to artifacts, features, and architecture of archaeological sites as well as increase the chance of erosion also damaging these sites. Thus, reducing the severity and duration of fires would, over the long run, reduce impacts to cultural resources in the area. There could possibly be increased short-term impacts relating to increased RxFire, WFU, ES&R and restoration, or other fire management practices. As described above, RxFire, rangeland drill, and seeding all have the potential to affect artifacts on archaeological and historical sites, features and architecture on sites, as well as the spatial relationships between artifacts and features. Thus, there is the potential for increased contribution of negative cumulative impacts from the actions proposed in this EIS when considered in conjunction with other fire management activities in the area as they may increase the frequency of occurrence in the region of the types of activities that can affect cultural resource sites. However, as mentioned above, pre-treatment inventory and avoidance procedures following Section 106 of the NHPA would mitigate many of these cumulative impacts. Indeed, the identification procedures are likely to assist in the management and preservation of cultural resources as they add to the body of knowledge regarding cultural resources. The contribution of this project to cumulative impacts may vary, however, depending on each alternative. Thus, cumulative impacts must be examined relative to the alternatives in terms of their contribution to other plans for reducing the severity and duration of fires.

In general, the cumulative effects on cultural resources for each alternative would be related to the amount of acreage moving from FRCC 3 to FRCC 1. Because the general goals of the other fire management plans and regional strategies are to, in essence, reduce the amount of acreage in FRCC 3 and increase the amount in FRCC 1, these plans should have a positive effect on cultural resources by reducing the amount of damage to cultural resource sites over the long term. Consequently, the alternatives proposed in this EIS should also be considered in terms of their overall contribution to reducing the severity and duration of fires. Alternatives that achieve a reduction in the severity and duration of fires under this EIS would, in combination with the actions undertaken in other regional plans, have a greater positive effect than those that do not reduce, or reduce in lower amounts, the severity and duration of fires.

Although there is not a direct relationship between number of acres affected by fire of various intensities and the number of sites affected, it is the case that in general, as more acres are subject to fewer fires or fires of lower severity, fewer archaeological and historical sites would be affected. Of the four alternatives, Alternative A changes the FRCC of the least number of acres. Under Alternative A, unwanted wildland fire would likely continue to trend toward large, high-severity fires, and potentially increasing numbers of cultural resources would be impacted as more acreage is burned or subjected to control and suppression activities. This could result in increasing impacts to cultural resource sites. Thus, Alternative A would have the least positive contribution to cumulative impacts when considered in conjunction with fire management plans and activities in the foreseeable future.

Under Alternatives B, C, D, the number, size, and severity of unwanted wildland fire is expected to decrease over time as fuel loads decrease. As the number and severity of unwanted wildland fires decreases, it would be expected that the overall frequency of damage to culturally important resources and sacred sites would then decrease. Further, as the number of acres treated through mechanical and/or chemical means or through RxFire increases, larger numbers of cultural resources and sites will be identified through pre-treatment inventories and consultation. As these sites and areas are identified, the proposed fuels treatment can be designed to avoid or limit

adverse impacts. Indeed any of these alternatives would result in changing the FRCC of a vastly greater number of acres than all of the other regional foreseeable future actions combined.

There are, however, variations in the amount of acres that would have FRCC among the actions other than Alternative A. Alternative B would result in an increased number of acres with a changed FRCC relative to Alternative A. Relative to Alternative A, Alternative B would have a greater positive cumulative contribution. However, Alternative C and D both result in proportionately much greater long-term change in FRCC in the District and adjacent areas than Alternative B, Alternative A, or the previously described reasonably foreseeable future actions. Thus, these alternatives would have a significant positive cumulative impact on cultural resources when considered with other actions in the region. This positive contribution to cumulative impacts in the area would be much greater than either Alternative A or Alternative B.

4.14 ANALYSIS OF EFFECTS ON NATIVE AMERICAN TRIBAL CONCERNS

4.14.1 ANALYSIS ASSUMPTIONS AND METHODS

Several sites, natural resources, and areas of cultural concern to Tribal groups claiming patrimony to lands within the District are known to the BLM. The identification of such resources has come through archaeological inventories of approximately 5 percent of the planning area and through related consultation with Tribes. Given that such a small percentage of the District has been subject to intensive cultural resource inventories and that regional Tribes have undoubtedly not disclosed the location and nature of all resources of cultural interest, it is reasonable to assume that many additional sites, resources, and areas of concern exist but are not yet known to the BLM. Consequently, the specific effects of implementing Alternative B or one of the other action alternatives on all individual sites, resources, and areas is, to some degree, unknown at this time.

It is the case that all specific federally funded or licensed projects on BLM-administered land are subject to review under Section 106 of the NHPA (36CFR800) and other federal legislation, which mandate consultation with Tribes to assess and address cultural and religious concerns prior to an undertaking. Overall, certain generalities exist as to the impacts of WFU and fire management on given types of sites and resources important to Tribes, and as such, this information can be used to predict how implementation of this EIS is likely to affect such resources in the District.

The various potential impacts to cultural resources and sites of cultural patrimony consist of a wide range of possible effects from wildland fire, RxFire, and other fuels treatments. For the purpose of this analysis, it is assumed that the worse impacts to cultural resources would occur in cover types that are presently in or moving towards FRCC 2 or 3. This is because higher severity fires, larger fires, and loss of ecosystem components are assumed to create detrimental effects on cultural resources presently in the natural environment. Similar effects are assumed for natural resources (i.e., cover types such as juniper woodlands and camas prairies and wildlife species such as deer, grouse, rabbits, etc.) of concern to Tribes, though, as discussed in more detail below, implementation of some treatments may benefit these natural resources.

Since archaeological resources are often identified as culturally important by Tribes, and since a discussion of predicted impacts on cultural resource sites (prehistoric and historical archaeological and structural sites) is included in Section 4.13 of this document, these impacts

are not discussed here. It must be recognized, however, that Tribes may have concerns about impacts to specific archaeological sites from implementation of the proposed alternative or any other alternative and that these concerns must be identified and addressed through the aforementioned Section 106 process. This section will address impacts to non-site resources of known importance to the Tribes within the District.

4.14.2 EFFECTS COMMON TO ALL ALTERNATIVES

Native American Tribes subsisted on the lands within the District boundaries for thousands of years. Existing ethnographic information generally suggests that aboriginal populations constantly traversed the Snake River Plain during their seasonal subsistence rounds, moving to the Camas Prairie in the spring to gather camas roots and then further into the mountains for the summer. In the fall, they would return to the Snake River for the winter (Steward 1938). Tribes from the District area procured deer, elk, mountain sheep, and moose from the mountains of the Sawtooth, Teton, and northern Wasatch Ranges and harvested salmon from rivers in south-central and southwestern Idaho (Hultkrantz 1974). The Shoshone-Bannock Tribes still hunt game and gather on BLM-administered lands today and continue to ascribe cultural value to the Snake River corridor and the Camas Prairie. Some traditional cultural sites identified as important by modern Native American Tribes may consist entirely of plant resources (a traditional gathering place). All of these resources could experience short-term impacts from implementation of fire management vegetation treatments. These would include the potential loss of some wildife and fish, damage or loss of cultural sites, and loss of plant resources. However, all of these resources would also experience long-term benefits from these fire management activities as vegetation and associated wildlife habitat improves (See Sections 4.2, 4.4. and 4.5). Detailed descriptions of these impacts are given below

Note that there are no treatments proposed in pinyon pine stands in any of the four alternatives, accordingly there would be no impacts to Tribal gathering of pinyon pine nuts.

4.14.2.1 Direct and Indirect Impacts

4.14.2.1.1 Burn (RxFire)

RxFire provides several opportunities for management of Tribal concerns. Even though fire can have an impact on some cultural/tribal resources, it can have a positive effect on others. For example, the removal of ground cover or thick stands of vegetation can expose previously unknown traditional properties or sites that were unknown to Tribes but are considered culturally or religiously important to those groups. Similarly, some traditional cultural sites identified as important by modern Tribal groups consist entirely of plant resources (a traditional gathering place) such as juniper woodlands or of traditional hunting areas for deer, elk, pronghorn, grouse, and other wildlife species. These cover types and wildlife populations may indeed benefit from periodic burning or other treatment, developing into healthier stands of the given plant or better habitat for wildlife. This, in turn, promotes better returns for the Tribes under their treaty hunting rights.

Under Section 106, consultation will take place with the Tribes prior to RxFire. The consultation will strive to identify specific sites and resources, such as traditional plant resource collection areas and hunting areas, of importance to the Tribes. If such sites or resources are identified, the RxFire plan will be tailored to avoid adverse impacts to the sites or resources and the Tribes' right of access to hunting and gathering will be maintained. For a detailed discussion of the

effects of RxFire on wildlife resources, some of which are important to the Tribes as part of their subsistence practices and under their treaty hunting rights, see Section 4.5 of this document.

For a detailed discussion of the effects of RxFire on archaeological resources, some of which may be identified by the Tribes as culturally important, please see Section 4.13 of this document. The physical effects of fire on archaeological resources as described in Section 4.13.2. may render a resource unable to fulfill its function in or to be used by a Tribe for perpetuating cultural ideology or identity.

4.14.2.1.2 Wildland Fire Use (WFU)

The effects of WFU on resources of concern to Tribal groups are similar to those described for RxFire, assuming wildland fire timing and location would be similar to that of an RxFire and would meet the same management objectives. For a discussion of the effect of WFU on archaeological resources, some of which may be deemed sacred or culturally important by the Tribes, see Section 4.13.2 of this document.

Impacts of WFU and RxFire would be minimized since site-specific NEPA analysis, including a cultural resources inventory, would be performed before any fire treatments would be applied on the ground. Particular natural resources such as certain cover types and the habitat of wildlife species of concern to Tribes may be readily identifiable in a wildland fire situation and may be able to be protected or benefited through effective control of the fire. Archaeological resources of concern, on the other hand, are not likely to be so readily identifiable, and given that only 5 percent of District lands have been inventoried for such resources, their presence in any given area is not likely to be known prior to the outbreak of wildland fire. As such, these unidentified archaeological sites would be subject to those wildland fire impacts described in Section 4.13.2 of this document. Such impacts could adversely affect the ability of an archaeological site to function properly in its role within the tribal culture. Post-fire rehabilitation of archaeological sites may be able to mitigate some of these adverse impacts.

As part of ongoing consultation with the Tribes under Section 106, traditional hunting and gathering areas that remain in active use by tribal members and/or areas by the Tribes as important for traditional or ideological reasons will be identified within the District. To the extent that such resources are known to exist within an area subject to treatment by WFU they will be avoided unless consultation results in an agreement between the BLM and the Tribes that treatment by WFU will benefit the resources of importance to the Tribes and is acceptable to the Tribes. Plans for treatment by WFU will be tailored to insure the maintenance of tribal access rights and will include measures to protect the nesting and wintering habitat of critical wildlife species.

4.14.2.1.3 Chemical Treatment

The chemical application of herbicides to control invasive species/noxious weeds during ES&R and restoration can also affect cultural resources. Although no studies have examined the specific effects of these types of activities on cultural resource sites, due to the straightforward nature of the activities it is possible to confidently postulate potential effects of these actions. Herbicides may contribute to the erosion of some types of artifacts and features that may be identified by Tribes as culturally important or sacred. In cases other than emergency suppression of wildland fire, the impacts from chemical treatment to archaeological sites and/or cover types of concern to Tribes can be minimized through pre-treatment inventories and consultation as mandated by

Section 106 of the NHPA. In emergency situations, post-treatment rehabilitation and restoration may help mitigate adverse impacts to artifacts, sites, or natural resources of importance to Tribes.

Impacts from chemical treatment to cover types and wildlife resources of traditional importance to the Tribes is expected to be minimal. Chemical treatments target invasive plant species and have little to no effect on the types of native plants having cultural value for the Tribes. Indeed, the effect of chemical treatment on native cover types will, in most cases, be to enhance the quality of the native cover types through the reduction of competing invasive plants. Impacts on wildlife are expected to be similarly minimal and primarily short-term in duration as they are related to increased noise and activity directly associated with the chemical treatment. Only BLM-approved chemicals would be utilized, and they would only be applied with climatic conditions were conducive to minimal airborne drift, thereby reducing even further the potential for adverse impacts to wildlife.

4.14.2.1.4 Mechanical Treatment

Mechanical activities can include, mowing, chaining, disking, chopping, and cutting of surface vegetation, and application of seeds via rangeland drill. In general, the impacts from mechanical treatments on cultural resources are related to the physical disturbance of artifacts and features by the mechanical activities. For a discussion of potential impacts to archaeological resources, some of which may be deemed important by the Tribes for traditional or ideological reasons, please see Section 4.13.2 of this document.

In general, potential adverse impacts to resources of importance to Tribes can be significantly reduced through carrying out the Section 106 process as mandated by the NHPA and BLM guidelines. Pre-treatment inventories or other means of identifying archaeological sites in a proposed treatment area prior to ground disturbance combined with consultation with regional Tribes can aid in the avoidance of culturally important or sacred sites and natural resources. Opportunities to use mechanical treatments to improve important resources such as juniper woodlands or camas prairies (not currently slated for fuels treatments) can also be identified through this process. If archaeological resources or hunting and gathering areas of importance to the Tribes are identified during pre-treatment consultation and/or inventory, the plans for specific mechanical treatment of the given area will be tailored to avoid physical impacts to such resources. Consultation with the Tribes may, however, result in an agreement between the BLM and the Tribes to allow mechanical treatment in traditional hunting and gathering areas with an acceptance of potential short-term impacts to wildlife that that may be displaced by seeding activities or to cover types that may be temporarily thinned but will recover in healthier forms. Mechanical treatment will be tailored to insure tribal treaty rights for access to public lands are maintained.

4.14.2.1.5 Seeding Treatment

The introduction of seeds to cultural resource sites either aerially or via rangeland drill could potentially affect cultural resource sites or natural resources areas identified by regional Tribes as important or sacred. Introducing seed through drilling has the greatest potential to directly disturb archaeological sites as described above for mechanical treatments. These impacts can be significantly reduced, however, by undertaking pre-treatment inventories to identify cultural resources within the proposed treatment area and designing seeding programs to avoid important or sacred sites. Aerial seeding has less potential for direct impacts to archaeological sites, as

there is no specific ground disturbance (unless the ground surface is disturbed by mechanical means to prepare for aerial seeding).

Seeding, either by rangeland drill or aerial introduction, has the potential to impact natural resources of importance to Tribes as well. Particular species may be of importance to the Tribes and could be affected by a change in cover type. In some cases, seeding may improve the condition of rangelands, increase plant cover, improve the diversity and quality of these cover types, and improve habitat for wildlife important to the Tribes.

Wildlife may, however, be temporarily displaced by seeding activities, and cover types of importance to the Tribes may experience temporary decreases in productivity as new plants grow to productive sizes. These potential adverse impacts to tribal hunting and gathering practices can be reduced or avoided all together by identifying important resources to the Tribes through consultation with the Tribes under the Section 106 process and designing seeding plans around critical hunting and gathering seasons.

4.14.3 ALTERNATIVE A

Under this alternative, impacts to archaeological sites of importance to the Tribes could occur as described in Section 4.13.2 of this document. An estimated 250,200 footprint-acres could be subject to WFU, mechanical treatment, chemical treatment, RxFire, or seeding. Fires (either WFU or RxFire) would have a variety of effects on sites and resources deemed important to Tribal groups. ES&R and restoration activities could also result in impacts to such resources by either directly disturbing the archaeological sites through ground disturbing activities or through the effects of chemicals on artifacts or through temporary reductions in the productiveness of particular cover types or the temporary displacement of wildlife. In general, critical habitat for wildlife such as sage grouse, would continue to degrade, though existing levels of treatment for such habitat would continue and would provide some improvement to smaller geographic areas than would be the case under other alternatives. Additionally, some wildlife would be temporarily displaced by activities surrounding existing levels of RxFire, seeding, and mechanical and chemical treatments.

Standard BLM practice entails measures such as pre-action inventories for cultural resources in proposed treatment areas and consultation with Tribes to identify culturally important sites and resources. Such measures would be likely to mitigate many of the adverse impacts to resources of importance to the Tribes. Consultation with the Tribes would focus on identifying important resources and defining important periods of use (seasonal hunting and gathering activities) so that treatment plans would be tailored to avoid negative impacts to tribal treaty rights.

Please note that there are no treatments proposed in pinyon pine stands in Alternative A, accordingly there would be no impacts to Tribal gathering of pinyon pine nuts.

4.14.4 ALTERNATIVE B

Under Alternative B, it is estimated that approximately 646,000 footprint-acres in most cover types would be treated through WFU, RxFire, and/or other vegetation treatments. As the location of many cultural resource sites and important tribal resources is not known, it is likely that some resources could be impacted by treatment. Because it is generally the case that the likelihood of an archaeological site or culturally important resource being present increases with the acreage under consideration, the increased footprint-acreage for Alternative B (approximately three times the acreage of Alternative A), would be likely to result in an increased number of sites and

resources impacted. However, the relationship is not necessarily one-to-one; site and resource distribution is related to many factors and not directly related to acres. Therefore, it is not possible to accurately estimate how many more sites or culturally important resources would be affected. Fires (either RxFire or WFU) would have a variety of effects on archaeological and traditional sites and resources. ES&R and restoration activities could also result in impacts to such sites and resources by either directly disturbing artifacts or cover types through ground-disturbing activities or through the effects of chemicals on artifacts. Resources could be uncovered through mechanical treatment, burned through the use of fire, or possibly damaged through the application of chemicals as discussed above.

It is important to note that implementation of this alternative may benefit resources of Tribal concern. As noted above, some important tribal resources/sites consist entirely of cover types or of wildlife species targeted for hunting. Under this alternative, the quality of some cover types of cultural concern, such as the juniper woodlands could be improved through the reduction of invasive plants and other competing cover types. In particular, the removal of encroaching juniper in these woodlands would benefit the more mature juniper, which are of higher cultural value to the Tribes because of their increased size and productivity. Under the Alternative B, 30,400 footprint-acres within juniper cover types would be treated through WFU, RxFire, and chemical and mechanical means.

The improvement of the quality of cover types this alternative generally provides better habitat for wildlife species of traditional importance to the Tribes, though some temporary displacement of wildlife may occur during both treatment activities and the regeneration of cover types following treatment. Please see Section 4.5 of this document for more specific information on the short-term impacts of this alternative on wildlife in the District.

The BLM is required to consult with the Tribes prior to any undertaking, including the various types of treatments proposed under this alternative. Consultation with the Tribes would focus on identifying important sites and resources and defining important periods of use (seasonal hunting and gathering activities) so that treatment plans would be tailored to avoid negative impacts to tribal treaty rights. Tribal access rights to BLM-administered lands would be maintained under this alternative.

Please note that there are no treatments proposed in pinyon pine stands in Alternative B, accordingly there would be no impacts to Tribal gathering of pinyon pine nuts.

4.14.5 ALTERNATIVE C

Under this alternative, it is estimated that 1,686,000 footprint-acres would be treated through WFU, RxFire, and/or other vegetation treatments. As the location of many cultural resource sites and important tribal resources is not known, it is likely that some resources could be impacted by treatment. Because it is generally the case that the likelihood of an archaeological site or culturally important resource being present increases with the acreage under consideration, the increased footprint-acreage for this alternative (approximately seven times the treatment-acreage of Alternative A), would be likely to result in an increased number of sites and resources impacted. However, as discussed under the short-term and indirect impacts of Alternative B, the relationship of numbers of sites to acres treated is not necessarily one-to-one and is influenced by a number of environmental factors. Therefore, it is not possible to provide an exact estimate of how many more sites or culturally important resources would be affected under this alternative.

As with Alternative B, implementation of this alternative may benefit resources of Tribal concern. Under this alternative, the quality of some cover types of cultural concern, such as the juniper woodlands could be improved through the reduction of invasive plants and other competing cover types. In particular, the removal of encroaching juniper in juniper woodlands would benefit the more mature juniper, which are of higher cultural value to the Tribes because of their increased size and productivity. Nearly 60,500 footprint-acres of juniper cover types would be treated to reduce encroaching juniper through various means under this alternative.

Under this alternative, portions of the total footprint-acres would in part be unavailable to wildlife for varying periods over the short term. However, areas being rehabilitated or restored subsequent to treatments would continue to provide habitat value to certain species, particularly those that utilize early to mid-seral stages of those cover types. The majority of the treatment area under this alternative would be seeded following the vegetation treatments, which would result in a secondary short-term disturbance to wildlife attempting to re-inhabit these areas. All vegetation treatments would occur in accordance with established management plans and guidelines for wildlife species associated with the habitats being treated, which would reduce adverse impacts to wildlife to less than significant levels.

Consultation with the Tribes would take place prior to treatments proposed under this alternative. This consultation would focus on identifying important cultural resource sites, resource areas, and periods of critical use (i.e., the season of use of a given resource area) for the Tribes so that treatments can be tailored to avoid interference with treaty rights. Under this alternative, the access rights of the Tribes to BLM-administered lands would be maintained.

Please note that there are no treatments proposed in pinyon pine stands in Alternative C, accordingly there would be no impacts to Tribal gathering of pinyon pine nuts.

4.14.6 ALTERNATIVE D

Under this alternative, it is estimated that approximately 1,522,300 footprint-acres in Low-elevation Shrub, Perennial Grass, and Annual Grass would be treated through WFU, RxFire, and/or other vegetation treatments. Similar to Alternative B, archaeological and traditional resources could be uncovered through mechanical treatment, burned through the use of fire, or damaged through the application of chemicals. Specific potential impacts to archaeological resources under this alternative are described in greater detail in Section 4.13.6 of this document.

Under this alternative, fewer footprint-acres of known cover types of concern to Tribes would be treated than under other alternatives. In particular, fewer acres of juniper woodland (29,200 footprint-acres under this alternative) would be treated through various means, thus reducing the overall level of benefit to this resource of importance to Tribes within the District. Impacts would be similar to those described under Alternative B with the exception that they would be concomitantly higher in the sagebrush habitats due to the increased treatments. However, these impacts would be small-scale and short-term and, therefore, would be unlikely to impact wildlife population viability for any species of importance to the Tribes under their treaty hunting rights. Portions of the treated areas would in part be unavailable to wildlife over the short term, but areas being rehabilitated or restored subsequent to treatments would continue to provide habitat value to certain species, particularly those that utilize early to mid-seral stages of those cover types.

Consultation with the Tribes would take place prior to treatments proposed under this alternative. This consultation would focus on identifying important cultural resource sites, resource areas, and periods of critical use (i.e., the season of use of a given resource area) for the Tribes so that treatments can be tailored to avoid interference with treaty rights. Under this alternative, the access rights of the Tribes to BLM-administered lands would be maintained.

Please note that there are no treatments proposed in pinyon pine stands in Alternative D, accordingly there would be no impacts to Tribal gathering of pinyon pine nuts.

4.14.7 Mitigation and Monitoring

The BLM has formulated management restrictions to protect cultural resources and resources of concern to Tribes during fire management activities (see Chapter 2, Description of Alternatives). In addition to these restrictions, the BLM is required under Section 106 of the NHPA to identify archaeological and historical properties eligible for or listed on the National Register of Historic Places as well as sites and resources important to Tribal groups and to determine if these sites and resources would be affected by a specific action. Standard BLM policy prior to planned actions such as RxFires, is to conduct a reconnaissance or judgmental survey within portions of proposed burn areas where existing data reviews suggest that flammable properties or resources that might be vulnerable to damage by fires of the severity and duration of the RxFires are present. These areas would then be avoided if possible. Standard policy prior to ES&R and/or restoration activities is to have a comprehensive field surface inventory of the area in question conducted by a qualified professional. Following identification of archaeological and historical sites visible on the surface, the sites are demarcated and then avoided if possible during ground disturbing or other ES&R/restoration activities. More information on mitigation measures related specifically to archaeological resources can be found in Section 4.13.7 of this document.

In all cases, consultation with federally recognized Tribal groups claiming patrimony over the area of the undertaking is required by numerous federal laws and BLM policy. Consultation would focus on identifying important cultural resource sites, resource areas, and periods of critical use (i.e., the season of use of a given resource area) for the Tribes so that treatments, under any alternative, will be tailored to avoid interference with treaty rights. Under any alternative, the access rights of the Tribes to BLM-administered lands would be maintained. Additionally, the consultation process with Tribes would help identify opportunities to use proposed treatments to benefit cover types of importance to these groups.

4.14.8 Unavoidable Adverse Impacts

Unavoidable adverse impacts to culturally important resources or sacred sites from implementation of any given alternative are generally restricted to the largely unpredictable effects of wildland fire. Section 106 of the NHPA and BLM guidelines require identification of cultural resources and consultation with potentially affected Tribes prior to all undertakings. As such, for all components of the four alternatives that involve preventative treatments, pre-treatment inventories and consultation would be implemented to reduce to the greatest extent possible any adverse impacts on those resources identified by regional Tribes as important or sacred. However, in cases of wildland fire or treatment of fuel loads by WFU, pre-treatment inventories and consultation are not likely to be possible. As a result, cultural resources located in areas subject to wildland fire may be adversely impacted by either the fire itself or the suppression to control it.

4.14.9 Irretrievable and Irreversible Commitment of Resources

Irretrievable and irreversible impacts to culturally important resources or tribal sacred sites would be similar to those described for unavoidable adverse impacts. These impacts would be both irretrievable and irreversible based on the potential to completely destroy these sites and associated objects with WFU, RxFire and mechanical treatments. Short-term irretrievable impacts to vegetation types important to affected Tribes would also occur, however, these impacts would not be irreversible as these vegetation types could be rehabilitated/restored.

4.14.10 Cumulative Effects

Historical land management practices coupled with more recent drought conditions on lands within the District have resulted in a trend within existing cover types towards larger, high-severity wildland fires (typical under FRCC 3). As discussed elsewhere in this section and in Section 4.13, such fires have greater adverse impacts on cultural resources than do smaller, low-severity, and shorter duration fires. The exact numbers of such resources that have been impacted is currently unknown, as intensive level inventories for cultural resources have not been conducted for all areas burned as a result of wildland fire. Such inventories typically occur immediately prior to ES&R and restoration activities, which may lag behind the fire episode by as much a several years.

In contrast to earlier practices, current and future management practices both for lands under the jurisdiction of the District BLM and for adjacent lands under the jurisdiction of other local, state, and federal agencies is trending toward reducing the frequency and scope of larger, high-severity wildland fires. Of the existing fire management plans for non-Bureau agencies located within or adjacent to the District, two identify specific plans for acreages to be treated through WFU, RxFire, and chemical and mechanical treatments. In particular, the Sawtooth National Forest Plan, currently under revision, calls for fire and fuels treatment impacts on between 3 and 15 percent of the 2.2 million acres within the Forest boundary, depending on which alternative is selected. The Forest Plan also calls for the use of fire only as a treatment (as opposed to a mix of fire and mechanical or chemical treatment) for 16 to 90 percent of the Forest's Wildland Urban Interface watersheds. A similar but smaller-scale treatment regime is in place for the Caribou and Targhee National Forests through their 1997 Forest Plan. Under this plan, an average of approximately 9,000 acres per year are to be treated for fuels reduction with an increasing focus on treatment-acres within the Wildland Urban Interface.

Other fire management plans or general land use planning documents, such as those through the Idaho Department of Public Lands, and the INEEL are all currently in preparation or will be subject to revision based upon the selection of an alternative from this EIS. As such, exact treatment-acreages are unknown at this time; however, all of these plans will be tied closely to the selected alternative from this EIS and will individually result in the treatment of fewer footprint-acres than are proposed in the Alternative B , Alternative C, and Alternative D of this EIS. All of the plans will focus on fuels reduction and the movement of cover types toward FRCC 1.

As more acres are treated, more cultural resources (both archaeological sites and natural resources of importance to the Tribes) are likely to be impacted, resulting in an incremental impact on the collective cultural record of southern Idaho. It should be noted, though, that although an increase in the frequency of application of chemical, mechanical, and fire treatments has the potential to adversely impact increasing numbers of cultural sites, pre-treatment

inventories for cultural resources and consultation with Tribal groups under the mandates of Section 106 of the NHPA and BLM management restrictions are serving and will continue to serve as effective means for avoiding and mitigating these adverse effects. Further, archaeological sites are stationary entities; thus any physical impact to a site on NFS land (or lands under the jurisdiction of non-Bureau agencies) would not result directly in an impact to archaeological sites on BLM-administered lands. Natural resources of importance to the Tribes are different, however, in that wildlife management practices and efforts to control particular cover types on adjacent lands may impact similar resources on adjacent BLM-administered lands. Impacts to culturally important natural resources on the District resulting from fire management activities on adjacent lands is indirect and related to whether or not the adjacent management activities affect the FRCC of cover types and wildlife habitat on District. For a more detailed discussion of cumulative impacts on wildlife species, please see Section 4.5 of this document.

For the purposes of this EIS analysis, two basic scenarios are likely to occur in terms of cumulative impacts to cultural resources of importance to regional Tribal groups. Under Alternative A, wildland fire would likely continue to trend toward large, high-severity fires, and potentially increasing numbers of archaeological sites and culturally important natural resources related to Native American treaty rights would be impacted as more acreage is burned or subjected to control and suppression activities. This could result in increasing impacts to tribal traditional practices (such as resource gathering and hunting) and ideological/religious practices. Under the Alternatives B, C, and D, the number, size, and severity of wildland fire is expected to decrease over time as fuel loads are decreased. As the number and severity of wildland fires decreases, it would be expected that the overall frequency of damage to culturally important resources and sacred sites would then decrease. Further, as the number of acres treated through mechanical and/or chemical means or through RxFire increases, larger numbers of cultural sites and areas of concern for Tribes will be identified through pre-treatment inventories and consultation. As these sites and areas are identified, the proposed fuels treatment can be designed to avoid or limit adverse impacts.

4.15 ANALYSIS OF EFFECTS ON SOCIOECONOMICS

4.15.1 ANALYSIS ASSUMPTIONS AND METHODS

4.15.1.1 Relationship to Other Sections of the EIS

Social and economic analysis is related to the following sections. These sections should be consulted for more detailed information regarding impacts to their respective resources.

- Wildland Urban Interface
- Recreation
- Visual Resources
- Grazing

4.15.1.2 Qualitative versus Quantitative Data

Economic impacts are considered with respect to each major sector of the economy in the District. Where quantitative data is available a detailed analysis is shown. Where quantitative data is not available, a qualitative analysis is performed based on the best available data. Impacts

analysis follows the structure of Section 3.15, Socioeconomics, examining effects on the social and economic settings region-wide.

4.15.1.3 Fire Management Program Expenditures

The average cost of wildland fire treatment is $105 per acre. The average cost for wildland fire suppression is $140 per acre (BLM 2003). Total cost for fire management efforts in the District is calculated by multiplying the number of acres of wildland fire and treatment or suppression by the appropriate cost per acre.

Of the total expenditures for the fire management program in 2002, as expressed in Section 3.15, Socioeconomics, the following percentages are spent in each category below:

- 50 percent variable costs
- 35 percent fixed labor costs
- 25 percent other suppression costs (BLM 2003)

Both treatment and suppression have associated variable costs. Treatments are considered variable costs because they are contracted by the BLM. Contractors purchase seed, apply seed with rangeland drills, or aircraft. Seeding requires seedbed preparation, application of herbicides, planting, etc. Common variable costs for suppression include contracting for bulldozers to build fire lines and water trucks. Both treatment and suppression have the following associated variable costs that get funneled into the local economy: food, fuel, lodging, maintenance, vehicles, administrative costs, aviation, warehousing.

Variable costs are calculated by multiplying the total cost for fire management by 50 percent. It is assumed that only the variable costs would change with each alternative (BLM 2003).

Expenditures on variable costs are assumed to be an infusion of dollars into the regional economy. An economic multiplier is the dollars evident in the local community based on dollars spent in one sector of the community. For example, one dollar spent on fire suppression equates to dollars spent in the local economy. It is assumed that approximately 70 percent of variable costs are spent in the local economy.

4.15.1.4 Tourism

An assumption was made that tourism is more prevalent in areas with Aspen/Conifer, Mountain Shrub, Wet/Cold Conifer, and Riparian cover types.

4.15.1.5 Impacts of Improvement of FRCC

In general, it is anticipated that improvement in FRCC (moving from FRCC 3 towards 1) would provide long-term socioeconomic benefits through decreases in risks to human life and property; fire-fighter safety, fire-fighting costs, and an improvement in overall vegetative conditions (ground cover, diversity, composition, and structure).

The improvement of key ecosystem components could provide benefits for associated uses of renewable resources, such as timber, rangeland and wildlife habitat. Recreation, hunting and tourism would likely experience an increase with new dollars being spent in various local communities.

As wildland fire size decreases and restoration opportunities increase, the economic contribution of fire fighting would be off set by increased restoration activities that would occur throughout

the year, rather than only when fire suppression activity is high during the summer wildland fire months.

4.15.2 Effects Common to All Alternatives

4.15.2.1 Retail Trade Services

Retail trade services would only be affected secondarily by impacts to other sectors of the economy. Grazing and the government services sector could cause impacts to retail trade services. External factors that would affect retail trade services include changes to the amount of grazing, an increase or decrease in the government services sector, and changes to tourism region wide.

A second effect on the retail services and trade sector is the number of fire-fighters employed. More fire-fighters deployed to communities means more dollars spent in the retail and trade services sector on meals, gasoline, and other necessities. Conversely, a reduction of fire-fighters would translate into a decrease in retail economies in communities near fires. This is explained in more detail in the alternative analysis of variable costs.

4.15.2.2 Proportional Impacts

Based on the information shown in Section 3.15, Socioeconomics, certain counties rely more heavily on various market sectors of the economy. Counties with a high proportion of rangelands on BLM-administered lands could experience proportionally higher impact than the rest of the District. These counties include:

- Blaine
- Butte
- Camas
- Caribou
- Cassia
- Clark
- Gooding
- Oneida

Similarly, the following counties have a high degree of tourism contributing to the economy, and could experience higher impacts as tourism is impacted in each alternative:

- Blaine
- Fremont
- Bonneville

Retail trade centers in the region might also experience a proportionally higher degree of impact. Retail trade centers are located in the following counties:

- Bannock
- Bonneville
- Madison
- Twin Falls

4.15.3 ALTERNATIVE A

Impacts to the social setting under Alternative A include continued risk of wildland fire. Homes and structures, discussed with Wildland Urban Interface issues in Section 4.3, would be at the same risk as current conditions. High tourism areas could be affected by continued risk of wildland fire.

Direct impacts of Alternative A affecting the economic setting of the region include a change in grazing AUMs and fees. A total of 47,500 AUMs would be temporarily lost over a 10-year period, equating to a total of $65,075 in lost fees from grazing. In addition to direct dollar amounts lost in this sector, it should be noted that receipts collected by the BLM for grazing and timber harvesting are returned to the State and Counties. With continued large catastrophic fires, timber being burned, and allotments closed, AUMs are temporarily unavailable, and thus receipts returned to Counties are less.

Direct impacts would also be evident in BLM expenditures for fire management. Alternative A would equate to an approximate total of 107 million dollars in fire management costs over 10 years.

Indirect impacts would be manifested in the multiplier effect into regional economics. An economic multiplier is the dollars evident in the local community based on dollars spent in one sector of the community. For example, one dollar spent on fire suppression equates to dollars spent in the local economy. Based on the costs of fire management discussed in the assumptions with $140 per acre for suppression and $105 per acre for treatment, a total of approximately 133 million dollars would be spent over the next 10 years for the fire management in the District under Alternative A. Also stated in the assumptions is the distribution of variable versus fixed costs. Variable costs, and therefore areas of the economy that are boosted, include food, fuel, lodging, maintenance, vehicles, administrative costs, aviation, warehousing and seeding. Variable costs consist of 50 percent of the total cost for treatment and suppression. Assuming approximately 70 percent of variable costs are spent in the local and regional economy, approximately 47 million dollars would be funneled into the local economy (BLM 2003).

4.15.4 ALTERNATIVE B

Impacts to the current economic setting of the region under Alternative B would include a reduction of 122,783 in grazing AUMs cumulatively over 10 years. Associated fees that would be lost in this action would be $168,213. If permittees do not have sufficient private land for their livestock while public lands are rested for the two years following the vegetation treatment, they may need to lease additional private rangeland for their livestock. If permittees have sufficient private land of their own additional feed may need to be purchased for those livestock temporarily removed from the public lands. Cost implications of this impact are discussed in Section 4.9.

Impacts to fire management operations under this alternative would be a reduction in cost for the fire management program to approximately 114 million dollars over 10 years.

Indirect impacts would be manifested in the multiplier effect into regional economics. Based on the costs of fire management (114 million dollars) discussed in the assumptions, 50 percent of which is for variable costs. Assuming approximately 70 percent of variable costs are spent in the local and regional economy, approximately 40 million dollars would be funneled into the local economy, a decrease of approximately 7 million dollars from Alternative A (BLM 2003).

4.15.5 ALTERNATIVE C

Alternative C would result in a reduction in grazing of approximately 320,467 AUMs. This would result in a reduction of $437,040 in revenue from grazing. If permittees do not have sufficient private land for their livestock while public lands are rested for the two years following the vegetation treatment, they may need to lease additional private rangeland for their livestock. If permittees have sufficient private land of their own additional feed may need to be purchased for those livestock temporarily removed from the public lands. Cost implications of this impact are discussed in the Livestock Grazing Management of this EIS.

Impacts to fire operations costs would be an increase of approximately 65 million dollars from Alternative A for a total of 199 million in fire management cost.

Indirect impacts would be manifested in the multiplier effect into regional economics. Based on the costs of fire management (199 million dollars) discussed in the assumptions, 50 percent of which is for variable costs. Assuming approximately 70 percent of variable costs are spent in the local and regional economy, approximately 70 million dollars would be funneled into the local economy, an increase of approximately 23 million dollars from Alternative A (BLM 2003).

4.15.6 ALTERNATIVE D

Impacts to the regional economic setting under Alternative D would result in an approximate decrease of 289,268 AUMs, translating to approximately $396,297 in grazing fees lost over 10 years. If permittees do not have sufficient private land for their livestock while public lands are rested for the two years following the vegetation treatment, they may need to lease additional private rangeland for their livestock. If permittees have sufficient private land of their own additional feed may need to be purchased for those livestock temporarily removed from the public lands. Cost implications of this impact are discussed in the Livestock Grazing Management of this EIS. Alternative D would have the greatest impact on grazing income.

Impacts to fire operations costs would be an increase of approximately 50 million dollars from Alternative A for a total of 184 million in fire management cost.

Indirect impacts would be manifested in the multiplier effect into regional economics. Based on the costs of fire management (184 million dollars) discussed in the assumptions, 50 percent of which is for variable costs. Assuming approximately 70 percent of variable costs are spent in the local and regional economy, approximately 64 million dollars would be funneled into the local economy, an approximate increase of 17 million from Alternative A (BLM 2003).

4.15.7 MITIGATION AND MONITORING

There are no practical mitigation measures to mitigate for the potential socioeconomic impacts of the proposed project. However, it should be noted that the majority of unavoidable impacts are short-term, and would likely be offset by the increased long-term health of the District ecosystem and the associated long-term increase in the quantity of quality of its renewable resources.

4.15.8 UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts include the temporary decreases in grazing income and retail sales associated with increased fire management treatments, and the decrease in retail and services income resulting from decreased fire fighting expenditures.

4.15.9 Irretrievable and Irreversible Commitment of Resources

Irretrievable impacts to socioeconomics include the short-term loss of grazing income and retail sales described above. However, this short-term revenue loss would be offset by long-term improvements in rangeland quality, as well as decreased risk to recreational setting, and visual resources. Improvements in these resources would likely result in increased long-term retail sales based on continued increased recreational visitation to the District. Accordingly, the loss of these revenues would not be irreversible.

4.15.10 Cumulative Effects

Cumulative impacts to socioeconomics are considered relative to the long-term effects of Alternative B in relation to other similar plans. These similar plans include the Interior Columbia Basin Ecosystem Management Project, the INEEL management plan, the Sawtooth, Caribou, and Targhee National Forests management plans, and the Idaho Statewide Implementation Strategy for the National Fire Plan. Overall, most of the goals of these plans are to reduce the intensity and duration of fires in the region.

In the short term, additional fire management programs proposed in the above plans could cumulatively affect the cost of fire operations, reducing the cost of wildland fire suppression in addition to each of the alternatives. Short-term indirect cumulative impacts could include a further reduction of dollars input to the regional economy based on the services required for wildland fire suppression.

Since the long-term impact of reducing the intensity and duration of fires would reduce risk to personal property and tourism lands (and hence the tourist economy), further reduction of wildland fire associated with the each of the past, present and reasonably foreseeable future actions would reduce risks even further.

Cumulative impacts may vary in intensity depending on each alternative. In general, the long-term cumulative effects on socio-economics for each alternative would be related to the amount of acreage moving from FRCC 3 to FRCC 1. Of the four alternatives, Alternative A changes the FRCC of the fewest number of acres. Thus, Alternative A would have the least positive cumulative impact in conjunction with the other plans and management strategies in the foreseeable future. Alternative B would result in an increased number of acres with a changed FRCC relative to Alternative A. Both Alternatives C and D would provide substantially greater improvements to the cumulative FRCC in the area than either Alternative A or Alternative B.

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